TAX INCENTIVES FOR THE PRODUCTION AND USE OF ETHANOL FUELS

HEARING

BEFORE THE

SUBCOMMITTEE ON OVERSIGHT

OF THE

COMMITTEE ON WAYS AND MEANS
HOUSE OF REPRESENTATIVES

NINETY-EIGHTH CONGRESS

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CONTENTS

Page

Press release of June 19, 1984, announcing the hearing 1
Background material 2

WITNESSES

Agri-Energy, Inc., Edward J. Wilkinson 58
American Agriculture Movement, Jerome Hickman 72
American Automobile Association, Durand C. Young 77
American Energy, Inc., Clayton Litchfield 41
Archer Daniels Midland Co., Doug Snyder 249
Ashland Oil, Inc., James G. Booten 97
Booten, James G., Ashland Oil, Inc 97
Conklin Co., Inc., Robert Thornberg 111
Daschle, Hon. Thomas A., a Representative in Congress from the State of South Dakota 33
Davis, Roger, Johnson Bros. Corp., and Minnesota Alcohol Producers 99
Dawn Enterprises, Inc., Leon F. Dubourt 55
Direnfeld, Barry B., New Energy Co. of Indiana 140
Dobbs, Thomas L., South Dakota State University 34
Doyle, Thomas D., Douglas County, Nebraska 81
Dubourt, Leon F., Dawn Enterprises, Inc 55
Graf Feed & Fuel Alcohol, Kathleen Graf 109
Hallberg, David E., Renewable Fuels Association 118
Hickman, Jerome, American Agriculture Movement 72
Highway Users Federation, Durand C. Young 77
Hotz, Alfred J., Augustana College 244
Johnson Bros. Corp., Roger Davis 99
Kennel, Robert P., Ultrasystems, Inc 46
Litchfield, Clayton, American Energy, Inc 41
Marathon Oil Co., James A. Wilkins 93
McIlroy, Dean L., North Dakota Agricultural Products Utilization Commission 70
Middaugh & Associates, Inc., Paul R. Middaugh 247
Minnesota Alcohol Producers, Roger Davis 99
Moors, H. Jack, Nebraska Corn Growers Association 243
National Alternative Energy Association, Edward J. Wilkinson 58
National Association of Wheat Growers, Wayne Nelson 63
Nebraska Corn Growers Association, H. Jack Moors 243
Nebraska Gasohol Committee, Todd C. Sneller 144
Nelson, Wayne, Nelson Farming, Inc., and National Association of Wheat Growers 63
New Energy Co. of Indiana, Barry B. Direnfeld 140
North Dakota Agricultural Products Utilization Commission, Dean L. McIlroy 70
Renewable Fuels Association:
  W.R. Schwandt 104
  David E. Hallberg 118
Schwandt, W.R., A.E. Staley Manufacturing Co., and Renewable Fuels Association 104
Sneller, Todd C., Nebraska Gasohol Committee 144
Snyder, Doug, Archer Daniels Midland Co 249
South Dakota Auto Club, Inc., Durand C. Young 77
South Dakota Farmers Union, Leland Swenson 73
Staley, A.E., Manufacturing Co., W.R. Schwandt 104
Swenson, Leland, South Dakota Farmers Union 73

Page
Thornberg, Robert, Conklin Co., Inc 111
Ultrasystems, Inc., Robert P. Kennel 46
Wilkins, James A., Marathon Oil Co 93
Wilkinson, Edward J., National Alternative Energy Association, and Agri-Energy, Inc 58
Young, Durand C., South Dakota Auto Club, Inc., American Automobile Association, and Highway Users Federation 77

SUBMISSIONS FOR THE RECORD

Agri Food & Fuel Cooperative, Nebraska Public Power District Marketing Department, statement 257
Alco, Inc., D.R. Paugh, statement 258
American Enterprise Institute for Public Policy Research, Russell Chapin, letter and attachments 260
Bedell, Hon. Berkley, a Representative in Congress from the State of South Dakota, statement 271
Farmers Political Watchdog Committee, Terry Bjerke, statement 272
Internoor Trade, Inc., Eugene T. Rossides, statement 273
Kentucky Power Alcohol Association, Inc., Jack Wade, statement 276
Massachusetts Technology Park Corp., statement 277
National Corn Growers Association, Dain Friend, statement 279
National Grange, Edward Andersen, letter 280
Ohio Farm Bureau Federation, Inc., C. William Swank, statement 280
Scott, Harry, Wilmot, SD, letter 283

TAX INCENTIVES FOR THE PRODUCTION AND USE OF ETHANOL FUELS

MONDAY, JULY 9, 1984

House of Representatives,
Committee on Ways and Means,
Subcommittee on Oversight,
Sioux Falls, SD.

The subcommittee met at 9:30 a.m., pursuant to notice, in the International West Room, Sioux Falls Downtown Holiday Inn, Sioux Falls, SD, Hon. Byron L. Dorgan presiding.

[The press release announcing the hearing and background material follow:]

[Press Release No. 19, June 19, 1984]

Hon. Charles B. Rangel (D., N.Y.), Chairman, Subcommittee on Oversight, U.S. House of Representatives, Announces a Hearing To Examine the Tax Incentives for the Production and Use of Ethanol Fuels

The Honorable Charles B. Rangel (D., N.Y.), Chairman of the Subcommittee on Oversight, Committee on Ways and Means, announced today that the Subcommittee will hold a field hearing to examine the tax incentives available for the production and use of domestically produced renewable ethanol fuels (e.g., gasohol). The hearing will be held in Sioux Falls, South Dakota, on Monday, July 9, 1984, and will begin at 9:30 a.m., in the Sioux Falls Downtown Holiday Inn. The Honorable Byron L. Dorgan, a Member of the Subcommittee, will chair the hearing.

The Subcommittee's review will focus on issues surrounding the taxation of ethanol fuels, including related economic and energy policy issues, and whether any changes to present law rules are in order. The Subcommittee expects to receive testimony from invited and public witnesses.

Briefly, there are three main tax provisions which provide incentives for the production and use of alcohol fuels:

(1) Excise tax exemptions for alcohol fuels mixtures and alcohol fuels

Present law provides a 5-cents-per-gallon exemption from the 9-cents-per-gallon excise tax on gasoline, diesel fuel, and special motor fuels for fuels consisting of mixtures of either of those fuels with at least 10 percent alcohol. The term alcohol is defined to include only alcohol derived from a source other than petroleum, natural gas, or coal. The exemption applies to any sale on or before December 31, 1992.

Present law also provides a 9-cents-per-gallon exemption from the excise tax on special motor fuels for certain methanol and ethanol fuels. The exemption applies to alcohol fuels comprised of at least 85 percent methanol, ethanol, or other alcohol. The exemption does not apply to such alcohol fuel derived from petroleum or natural gas. The exemption expires on October 1, 1988.

(2) Alcohol fuels credit

Present law allows an income tax credit for alcohol used in certain mixtures of alcohol and gasoline, diesel fuel, or any special motor fuel if the mixture is sold by the producer for use as a fuel or is so used by the producer. The credit is equal to 50 cents for each gallon of alcohol used in a qualified mixture. The credit is available only if the sale or use is in a trade or business of the person claiming the credit.

The 50-cents-per-gallon credit is also permitted for alcohol, other than alcohol mixed with gasoline, diesel fuel, or any special motor fuel which is used by the taxpayer as fuel in a trade or business or is sold at retail by the taxpayer and placed in the fuel tank of the purchaser's vehicle.

The amount of any person's allowable alcohol fuels credit is reduced to take into account any benefit received with respect to the alcohol under the excise tax exemptions for alcohol fuels mixtures or alcoohol fuels. For purposes of the credit, the term alcohol includes methanol and ethanol, but does not include alcohol produced from petroleum, naturl gas, or coal, or alcohol with a proof less than 150. The credit applies to any sale or use on or before September 30, 1988.

(3) Duty on imported alcohol fuels

Present law imposes a duty equal to 50-cents-per-gallon on alcohol imported into the United States for use as a fuel. The duty expires on December 31, 1992.

DETAILS FOR SUBMISSION OF REQUESTS TO BE HEARD

Individuals and organizations interested in presenting oral testimony before the Subcommittee must submit their requests to be heard by telephone to Harriet Lawler [(202) 225-3627] no later than close of business, Tuesday, June 26, 1984, to be followed by a formal written request to John J. Salmon, Chief Counsel, U.S. House of Representatives, 1102 Longworth House Office Building, Washington, D.C. 20515. Notification to those scheduled to appear will be made by telephone as soon as possible after the filing deadline.

It is urged that persons and organizations having a common position make every effort to designate one spokesperson to represent them in order for the Subcommittee to hear as many points of view as possible. In addition, witnesses may be grouped as panelists. Time for oral presentations will be strictly limited to 5 minutes with the understanding that a more detailed statement may be included in the printed record of the hearing. This process will afford more time for the questioning of witnesses.

In order to assure the most productive use of the limited amount of time available, witnesses scheduled to appear are required to bring 25 copies of their prepared statement to the hearing.

Requests to be heard must contain the following information:

1. The name, full address, and capacity in which the witness will appear, as well as a telephone number where the witness or a designated representative may be reached;
2. A list of any clients or persons, or any organization for whom the witness appears; and
3. A topical outline or summary of comments and recommendations.

The above information should also be incorporated in the prepared statements to be presented in person as well as those filed for the printed record of the hearing.

WRITTEN STATEMENTS IN LIEU OF PERSONAL APPEARANCE

Persons submitting a written statement in lieu of a personal appearance should submit at least six (6) copies of their statement by the close of business, Friday, August 17, 1984, to John J. Salmon, Chief Counsel, Committee on Ways and Means, U.S. House of Representatives, 1102 Longworth House Office Building, Washington, D.C. 20515. If those filing written statements for the record of the printed hearing wish to have their statements distributed to the press and the interested public, they may provide copies for this purpose to the Subcommittee before the hearing begins.

TAX INCENTIVES FOR THE PRODUCTION AND USE OF ETHANOL FUELS

Scheduled for a Field Hearing
(Sioux Falls, South Dakota)
Before the
Subcommittee on Oversight
of the
Committee on Ways and Means
on
July 9, 1984

Prepared by the Staff
of the
Joint Committee on Taxation
July 5, 1984

JCX-32-84

INTRODUCTION

The Ways and Means Subcommittee on Oversight has scheduled a field hearing in Sioux Falls, South Dakota on July 9, 1984, to examine tax incentives for the production and use of ethanol fuels.

The first part of this document is a brief summary of the tax incentives provided under present law. This is followed in the second part by a more detailed description of these incentives, including changes made by the Tax Reform Act of 1984.

I. SUMMARY

Present law provides a 5-cents-per-gallon excise tax exemption for alcohol fuels mixtures (e.g., gasohol). A 50-cents-per-gallon income tax credit is provided for the alcohol content in gasohol and for alcohol fuels. A 50-cents-per-gallon import duty is imposed on alcohol imported for use as a fuel.

The Tax Reform Act of 1984, passed by Congress on June 27, 1984, increases the excise tax exemption to 6 cents per gallon; the income tax credit and import duty are increased correspondingly to 60 cents per gallon. These changes are effective on January 1, 1985.

Present law also provides a 9-cents-per-gallon excise tax exemption for alcohol fuels that are at least 85 percent pure if the alcohol is derived from a source other than petroleum or natural gas. The Tax Reform Act expands this provision to allow a 4-1/2-cents-per-gallon excise tax exemption for these alcohol fuels when the alcohol is derived from natural gas. This change is effective on August 1, 1984.

II. DESCRIPTION OF PRESENT TAX INCENTIVES AND PROVISIONS OF THE TAX REFORM ACT OF 1984

A. Present Law

Excise tax exemptions for alcohol fuels mixtures and alcohol fuels

Alcohol fuels mixtures

Present law provides a 5-cents-per-gallon exemption from the excise taxes on gasoline, diesel fuel, and special motor fuels for fuels consisting of mixtures of any of those fuels with at least 10 percent alcohol (Code secs. 4041, 4081, and 6427). The term alcohol is defined to include only alcohol derived from a source other than petroleum, natural gas, or coal. This "gasohol" exemption is computed by treating the alcohol fuels mixture as if it were one of the other taxable fuels. The exemption does not apply to any sale or use after December 31, 1992.

Alcohol fuels

Present law provides a 9-cents-per-gallon exemption from the excise tax on special motor fuels for certain "neat" methanol and ethanol fuels (sec. 4041). The exemption applies to alcohol fuels comprised of at least 85 percent methanol, ethanol, or other alcohol. The exemption does not apply to such alcohol fuels derived from petroleum or natural gas. This exemption expires on October 1, 1988.

Income tax credit for alcohol fuels

Present law allows an income tax credit for alcohol used in certain mixtures of alcohol and gasoline, diesel fuel, or any special motor fuel (e.g., gasohol) if the mixture is sold by the producer for use as a fuel or is so used by the producer (sec. 44E). The credit is equal to 50 cents for each gallon of alcohol used in a qualified mixture. The credit is available only if the sale or use is in a trade or business of the person claiming the credit.

The 50-cents-per-gallon credit also is permitted for alcohol, other than alcohol mixed with another fuel, if the alcohol is used by the taxpayer as a fuel in a trade or business or is sold at retail by the taxpayer and placed in the fuel tank of the purchaser's vehicle.

The amount of any person's allowable alcohol fuels credit is reduced to take into account any benefit received with respect to the alcohol under the excise tax exemptions for alcohol fuels mixtures or alcohol fuels.

For purposes of the credit, the term alcohol includes methanol and ethanol, but does not include alcohol produced from petroleum, natural gas, or coal.

Duty on imported alcohol fuels

Present law imposes a duty equal to 50 cents per gallon on alcohol imported into the United States for use as a fuel (19 U.S.C. 1202).

B. Provisions of the Tax Reform Act of 1984

The Tax Reform Act of 1984 expands the tax incentives available for the production and use of ethanol fuels, as follows:

Alcohol fuels mixtures.--The Act increases the excise tax exemption for alcohol fuels mixtures to 6 cents per gallon. An additional amendment is made to clarify that alcohol derived from peat is treated as derived from coal in determining availability of this exemption for alcohol fuels mixtures.

Alcohol fuels.--The Act retains the present 9-cents-per-gallon exemption for alcohol fuels at least 85 percent pure if the alcohol is derived from a source other than petroleum or natural gas. The Act also provides a new 4-1/2-cents-per-gallon exemption for such fuels derived from natural gas. Otherwise qualified alcohol fuels that are derived from petroleum will continue to be subject to the full 9-cents-per-gallon excise tax on special motor fuels.

Alcohol fuels credit.--The Act increases the alcohol fuels credit to 60-cents-per-gallon. The Act further clarifies that alcohol produced from peat is deemed to be produced from coal; therefore, such alcohol is not eligible for the credit when used in an alcohol fuels mixture or as an alcohol fuel.

Duty on imported alcohol fuels.--The Act increases to 60-cents-per-gallon the duty on alcohol imported into the United States for use as a fuel.

Effective date.--The changes made by the Tax Reform Act generally are effective on January 1, 1985. The expansion of the excise tax exemption for alcohol fuels at least 85 percent pure is effective on August 1, 1984.

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FEDERAL TAX PROVISIONS RELATING TO THE PRODUCTION AND CONSUMPTION OF ALCOHOL FUELS

Salvatore Lazzari
Analyst in Taxation and Fiscal Policy
Economics Division
June 28, 1984

ABSTRACT

This report is an outline of those provisions of the Federal tax code which provide incentives for the production, sale, and consumption of alcohol fuels.

To promote the production and use of alcohol fuels, under present Federal tax law there is an exemption from the gasoline excise taxes, three types of income tax credits (the blender's fuel credit, the alternative fuel production credit, and the business energy investment tax credit), and an exemption on interest income on industrial development bonds.

CONTENTS

ABSTRACT iii

INTRODUCTION 1

I. EXEMPTION FROM MANUFACTURER'S EXCISE TAX ON GASOLINE AND SPECIAL MOTOR FUELS 1

II. THE ALCOHOL FUELS (BLENDER'S) TAX CREDIT 3

III. THE ALTERNATIVE FUELS PRODUCTION TAX CREDIT 5

IV. THE BUSINESS ENERGY INVESTMENT TAX CREDITS 8
  A. Alternative Energy Property 8
  B. Biomass Property 10

V. TAX-EXEMPT INTEREST ON INDUSTRIAL DEVELOPMENT BONDS 11

FEDERAL TAX PROVISIONS RELATING TO PRODUCTION AND CONSUMPTION OF ALCOHOL FUELS

INTRODUCTION

The Federal tax code of the United States contains a variety of provisions to stimulate the development of energy from alternative resources. This report is an outline of those tax provisions which are incentives for the production, sale, and consumption of alcohol fuels.

I. EXEMPTION FROM MANUFACTURER'S EXCISE TAX ON GASOLINE AND SPECIAL MOTOR FUELS

Internal Revenue Code (IRC) section 4081 imposes a 9-cent per gallon excise tax on producers or importers of gasoline. This is the same tax which motorists pay at the service station on purchases of gasoline for their vehicles. Another section of the IRC (IRC section 4041) imposes a 9-cent per gallon tax on diesel fuel, and special motor fuels such as benzene, liquefied petroleum gases, and other fuels (known as gasoline substitutes), sold for use in highway vehicles, motor vehicles, and motorboats. IRC section 4041 also imposes a 14-percent per gallon excise tax on liquid fuel sold for use in an aircraft in non-commercial aviation.

Under various subsections of IRC sections 4081 and 4041, alcohol fuels qualify for an exemption (partial or complete) from the excise taxes on gasoline and special motor fuels, respectively. IRC subsection 4081(c) exempts alcohol fuels from 5 cents of the 9-cent per gallon excise tax on gasoline. This exemption applies to any gasoline and alcohol mixture if at least 10 percent of the mixture is alcohol.

Also, this exemption applies primarily to methanol and ethanol, but could apply to other alcohol fuels, provided they are not produced from petroleum, natural gas, coal, or any derivative of these substances. Thus, alcohol under the exemption could be produced from materials such as agricultural and forestry products, urban waste, and other biomass wastes and residues. Finally, the alcohol must be at least 190 proof (95 percent pure).

In two subsections to IRC section 4041, alcohol fuel mixtures are exempt from part or all of the 9-cent per gallon excise tax on diesel and special motor fuels, depending upon the percentage of the mixture which is alcohol. Under subsection (b)(2) of IRC section 4041, the sale or use of diesel or special motor fuel that is at least 85 percent alcohol is exempt from the entire 9-cent per gallon excise tax. If the alcohol mixture is at least 10 percent alcohol, then subsection (b) exempts it from 5-cents of the 9-cents per gallon. This exemption applies, as before, provided that the ethanol, methanol, or other alcohol fuel is produced from a substance other than petroleum or natural gas. Unlike the exemption from the manufacturer's excise tax on gasoline, however, the excise tax exemption for alcohol fuels mixed with diesel and special motor fuels also applies when alcohol is produced from coal. Finally subsection (k) of IRC section 4041 also exempts alcohol fuel mixtures from the 14-cents per gallon tax on aviation fuel, if the mixture consists of at least 10 percent alcohol. In this case the alcohol cannot be produced from coal.

The excise tax exemptions of alcohol fuels (whether used as special fuels or in the production of gasohol) were introduced by the Energy Tax Act of 1978 (P.L. 95-618). Prior to 1978, motor fuels that were a blend of gasoline--or gasoline substitutes--and alcohol, and that were used in highway vehicles, would have been subject to the 4-cent per gallon excise tax in effect at that time. The Crude Oil Windfall Profits Tax Act (P.L. 96-223, enacted on April 2, 1980) extended the exemption from October 1, 1984, to December 31, 1992. This law also added certain technical amendments such as the one providing that alcohol must be at least 190 proof, another stipulating that the volume of any denaturant (including gasoline) must be included for purposes of determining the percentage of the fuel mixture which consists of alcohol. The Surface Transportation Assistance Act of 1982 (P.L. 97-424), also known as the Highway-Use Act, changed the Federal excise tax exemption on gasoline from complete exemption of the 4-cent tax to a 5-cent exemption from the 9-cent per gallon tax. The exemption from the 9-cent per gallon special motor fuels that are at least 85 percent alcohol was also increased from 4 cents to 9 cents per gallon by the 1982 legislation.

The Tax Reform Act of 1984 (H.R. 4170) as approved by the Congress on June 27, 1984, raises the excise tax on diesel fuel from 9 cents to 15 cents per gallon. This legislation also raises the 9-cent exemption for 85 percent alcohol mixtures to 15 cents and the 5-cent exemption for "10 percent" mixtures is raised to 6 cents per gallon. The excise taxes on special motor fuels and aviation fuel, as well as the corresponding exemptions, would not be amended.

II. THE ALCOHOL FUELS (BLENDER'S) TAX CREDIT

Alcohol which is used or sold as a fuel qualifies for an income tax credit for either the blender (in the case of gasohol or alcohol blended with other special fuels) or the user or retail seller (as in the case of straight "non-blended" alcohol fuels). This credit, called the alcohol fuels tax credit, is also referred to as the blender's credit (IRC section 44E). As with the excise tax exemptions for gasohol, the alcohol must be derived from a substance other than petroleum, natural gas, coal, or any derivative of these substances. Thus, only alcohol made from vegetative matter, crops, grain wood, and other biomass would seem to qualify for this tax credit.

The amount of this income tax credit per gallon depends upon the strength of the alcohol produced. The credit is 50 cents per gallon for alcohol of at least 190 proof, and 37.5 cents per gallon for alcohol between 150 and 190 proof. No credit is provided if the alcohol is below 150 proof. The tax credit is non-refundable and any credit unused in one year may be carried forward for up to seven years. 1/

In addition to its non-refundability, there is another important limitation to the alcohol fuels tax credit. Under subsection (c) of IRC section 44E, the amount of tax credit is reduced by the amount of excise tax exemption applicable to the fuel (i.e., either the 5-cent per gallon exemption on gasohol or the 9-cent per gallon exemption for alcohol used as a special fuel, as discussed in the previous section of this report). The alcohol fuels tax credit is not lost with respect to fuels that may also qualify for the excise tax exemptions, but the amount of the credit is reduced by the amount of the exemption. Also, the amount of credit which is used by the taxpayer is treated as income by the Internal Revenue Service and must be reported in the same year as when the credit is used.

Eligibility for the alcohol fuels tax credit depends upon whether the alcohol fuel is a blended mixture. In the case of a mixture, it is the blender who is eligible to claim the credit--as long as the mixture is used directly

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1/ A tax credit is not refundable when the amount of the credit cannot exceed the amount of tax liability.

by him in his trade or business, or if it is sold by the blender for use as a fuel. In most cases involving a straight or unblended fuel, it is the user who is eligible for the credit, as long as the fuel is used in a trade or business. However, if the alcohol fuel is sold at retail and placed in the fuel tank of the purchaser's vehicle, it is the retail seller, not the purchaser or user, who may claim the tax credit.

The alcohol fuels tax credit, which is available until January 1, 1993, was enacted as part of the Crude Oil Windfall Profits Tax Act of 1980 (P.L. 96-223) as one of several provisions intended to subsidize the production of alcohol fuels. The only major amendment occurred in 1982 when The Surface Transportation Assistance Act (P.L. 97-424) raised the amount of tax credit from 40 cents to 50 cents and from 30 cents to 37.5 cents for the two aforementioned alcohol categories for (for alcohol of at least 190 proof and for alcohol of between 150 and 190 proof, respectively).

III. THE ALTERNATIVE FUELS PRODUCTION TAX CREDIT

Alcohol fuels benefit from another non-refundable income tax credit that is part of a broad system of tax credits designed to encourage production and sale of fuels derived from various energy alternatives to oil and natural gas. This is the "alternative fuels production credit," and it is available, under certain conditions, until the year 2001.

Under IRC section 44D of the Federal tax law, production and sale of alcohol fuels derived from certain alternative energy resources may, when oil prices are low, receive a real tax credit (using 1979 as the base year) of $3 per barrel of oil equivalent. 2/ This $3 amount is indexed to increases

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2/ Technically, the credit is linked to the BTU (British Thermal Unit) content of oil. The $3 subsidy is given for each 5.8 million BTUs (which is roughly the energy content in a barrel of oil) of fuels produced from alternative sources.

in the GNP deflator since 1979, so that the nominal tax credit for 1983 would be about $4.00.

To qualify for this tax credit, the alcohol fuel must be produced from either coal or lignite. Alcohol fuels produced from any other source, including biomass, do not qualify for this tax credit. Thus, it would appear that the alternative fuel production tax credit is available only for the production of methanol and not for the production of ethanol.

The availability of the alternative fuels production tax credit is determined by the average wellhead price of domestic crude oil (called the reference price), and by the credit that is phased out when the inflation-adjusted base price of $23.50 rises to the inflation-adjusted level of $29.50 (in terms of 1979 prices). This rule is intended to protect the production of alternative fuels from reductions in oil prices. In other words, if the market price of oil (i.e., the reference price) falls below the inflation-adjusted base or trigger price, then the tax credit becomes available.

To illustrate, in 1980 the reference oil price was $33.03 and the inflation-adjusted base price was $25.61; i.e., the market price of oil was higher than the "trigger price." Therefore, the credit was not available, because, under the rationale of the credit, the market price of oil was high enough to provide ample incentives for alternative fuels production. When, however, the market price of oil declines below the inflation-adjusted base (or trigger) price, then the alternative fuel production tax credit would became available. The amount of the real tax credit is $3.00. In nominal terms, the tax credit is $3.00 times an inflation adjustment factor. For the 1983 tax year, the $4.00 production tax credit was available because the average price of domestic crude oil at the wellhead ($26.19) was below the inflation-adjusted base price ($31.01). Table 1 shows, for the years 1980-83, the reference prices, inflation-adjustment factors, inflation-adjusted base prices, and the amount of tax credit per barrel of qualified fuel, all of which relate to the alternative fuels production tax credit.

To reduce the possibility that taxpayers could receive multiple tax benefits, the alternative fuels production tax credit is reduced by the amount of business energy investment tax credit (discussed in the next section) used with respect to the equipment which produces the synthetic fuel. Secondly, the alternate fuels production tax credit is reduced in proportion to the amount of other Federal, State, and local energy subsidies, including grants. This would appear to include subsidies provided by the United States Synthetic Fuels Corporation, with the exception of loan guarantees; loan guarantees are not to be taken into account. However, the production tax credit is not limited by either the blender's tax credit or the excise tax exemption.

The alternative fuels production tax credit was enacted as part of the 1980 crude oil windfall profits tax; and, except for minor conforming amendments in 1981 and 1982, the credit has remained substantially unchanged.

TABLE 1. Data Used in Determining the Availability of the Alternative Fuels Production Tax Credit

	Reference Price for Qualified Fuels	Inflation Adjustment Factors	Inflation-Adjusted Base Price	Tax Credit Amount Adjusted for Inflation
1980	$33.03	1.0896	$25.61	$3.26
1981	32.19	1.1900	27.97	3.57
1982	28.50	1.2676	29.79	3.80
1983	26.19	1.3197	31.01	3.96

Source: Commerce Clearinghouse Inc., Standard Federal Tax Reporter 1983, p. 11, 146; and the Federal Register of April 9, 1981, April 1, 1982, and April 4, 1983; March 16, 1984.

IV. THE BUSINESS ENERGY INVESTMENT TAX CREDITS

Equipment used to produce certain alcohol fuels qualifies for a special 10 percent business energy tax credit which is in addition to the regular 10 percent investment tax credit.

In general, the business energy investment tax credit (henceforth, BEITC) is available for seven categories of property for producing energy from an alternative energy resource and for three categories of property for direct conservation of energy used in existing commercial or industrial processes. There are two categories of property, however, which include equipment for producing alcohol fuels: alternative energy property and biomass property.

A. Alternative Energy Property

More specifically, alternative energy property includes the following seven types of equipment: (1) certain types of equipment, such as boilers, burners, and combusters, which use an alternate substance (as defined in the subsequent paragraph) directly as a fuel, or equipment which modifies or adapts conventional oil/gas fired systems to use some alternative form of energy; (2) equipment for converting an alternate substance into a synthetic fuel including an alcohol fuel; (3) equipment for converting coal and lignite into a feedstock for the manufacture of chemicals and other products such as methanol, ammonia, and hydroprocessed coal (with the exception of coke and coke gas); (4) new coke ovens or the costs of rehabiliting existing coke ovens--including required pollution control equipment and on-site preparation and handling equipment--to produce coke and coke gas for use as a fuel or a feedstock; (5) any pollution control equipment which is required by law to be used in connection with any of the aforementioned types of alternative energy properties; (6) any collateral equipment which may be used to unload, prepare, store, or transfer an alternate substance which is itself used in the aforementioned types of properties; and (7) geothermal and ocean thermal property (please refer to the next page for a more detailed discussion of these types of renewable energy properties).

For purposes of the above types of alternative energy property, an alternate substance is defined as any substance other than oil, natural gas, and any product of oil and natural gas. It includes coal, peat, wood, municipal and industrial wastes, landfill, sewage, sludge, sludge grain, agricultural crop, and crop residues. An alternate substance does not include heavy oil, oil shale, or tar sands, because these are considered to be products of oil. Additionally, a fuel, such as alcohol fuel produced from an alternate substance, is not itself treated as an alternate substance. For example, the methanol produced from coal is not an alternate substance although the coal is. Therefore, equipment which uses such fuels would not qualify for the BEITC, although the equipment which produces the fuel does qualify. The rationale for this exclusion of fuels as alternate substances is that the Congress wanted to subsidize the production but not the consumption of alternate fuels that are nearly perfect substitutes for conventional fossil fuels in production processes.

The rate of business energy tax credit for alcohol fuels equipment and other alternate energy property is ten percent. Thus, an investment in some types of qualifying energy property can conceivably receive a total statutory credit of 20 percent (consisting of a 10-percent BEITC and a 10-percent regular investment tax credit).

It is important to mention that, except for certain long-term projects, the tax credit for alternative energy property expired on December 31, 1982. This means that investments which produce alcohol from coal or other alternate substances associated with new projects no longer qualify for the BEITC. The major exception is for long-term construction projects which have complied with the affirmative commitment rules. According to these rules, IRC section 46(a)(2)(c)(iii), the tax credit is extended through December 31, 1990, if: (1) all engineering and feasibility studies have been completed before January 1, 1983; and (3) before January 1, 1986, the taxpayer has entered into legally binding contracts for one-half of the estimated cost of all the equipment designed for the project.

B. Biomass Property

A second category of energy property which is considered an alcohol fuel investment and which qualifies for the BEITC is biomass property. Biomass property includes equipment for converting biomass into either a synthetic fuel or into an alcohol fuel. In addition, however, qualifying biomass property includes equipment which either uses the biomass directly, such as a burner or boiler, or which uses the biomass-derived synfuel [IRC section 48(l)(15)]. In the case of alternative energy property, equipment which used the synfuel as an input did not qualify for the BEITC. Additionally, equipment which stores synfuels derived from biomass is defined as biomass property and therefore qualifies for the ten percent tax credit. The latter provision is an exception to the general BEITC rule that only equipment used to the point of the actual production of energy from the alternate form of energy qualifies for a credit.

As is the case with types of alternative energy property, any collateral equipment such as pollution control equipment, or equipment required for transfer, loading, unloading, reclaiming, or preparation of the biomass is treated as biomass property and, therefore, also qualifies for the BEITC. For purposes of the energy tax credits, biomass is defined as any organic substance other than oil, natural gas, or coal, or any product of oil, natural gas, or coal. This would include municipal and industrial waste products, sewage, sludge, sludge grain, wood, crops, and crop residues. The rate of credit for biomass property is ten percent and the credit expires on December 31, 1985; the long-term affirmative commitment rules do not apply to biomass property.

The BEITC for alternative energy property, biomass property, and other categories of energy property, was enacted in 1978 as part of the the Energy Tax Act (P.L. 95618), which in turn was one of five separate public laws contained in the National Energy Act of 1978. Major amendments to the Energy Tax Act were made by the Crude Oil Windfall Profits Tax Act of 1980 (P.L. 96-223). More recently, relatively minor amendments have been made by the Miscellaneous Revenue Act of 1982 (P.L. 97-362) and by the Surface Transportation Assistance Act of 1982 (P.L. 97-424).

V. TAX-EXEMPT INTEREST ON INDUSTRIAL DEVELOPMENT BONDS

The last of the major tax code provisions of benefit to the development of alcohol fuels applies to facilities which produce the fuels from solid wastes. Such facilities qualify for tax-exempt financing under section 103(g) of the IRC. Such a qualification means that the facility may be financed with the proceeds of an industrial development bond, the interest income of which is exempt from Federal income tax. An industrial development bond is an obligation issued by a State or local government, the proceeds of which are used for development of a private trade or business and whose principal and interest is paid from any income earned from the trade or business or from the value of the trade or business itself.

Exemption of interest on certain industrial development bonds (IDBs) dates back to the 1930s, but the Revenue Expenditure and Control Act of 1958 (P.L.

90-364) introduced the basic provisions that now govern the tax treatment of industrial development bonds. The provisions to exempt alcohol fuel-producing facilities were added to IRC section 103 in 1980 under the windfall profits tax, as part of a general program to use the IDB's tax-exempt provisions of the IRC to subsidize alternative energy resources. Prior to 1980, IDBs used to finance energy projects were not tax-exempt unless they were small issues. No direct amendments to section 103(g) have been made since 1980. More recently, the two versions of H.R. 4170 in conference in June 1984 propose limits to the use of tax-exempt IDBs which would also apply to alcohol producing facilities.

GENERAL ACCOUNTING OFFICE REPORT
TO THE HONORABLE CHARLES H. PERCY,
DAVID DURENBERGER, AND
J. JAMES EXON
UNITED STATES SENATE

IMPORTANCE AND IMPACT OF FEDERAL ALCOHOL FUEL TAX INCENTIVES

DIGEST

Since 1978 the federal government has provided a variety of tax incentives to promote the development of the domestic ethanol (an alcohol fuel) industry. The most important of these incentives has been the exemption of gasohol--a blend of 10 percent ethanol and 90 percent gasoline--from federal gasoline excise taxes. Through 1992, gasohol is exempt from 5 cents of the 9 cent federal gasoline tax. Since only one-tenth of a gallon of ethanol is needed to exempt the entire gallon of mixed fuel from tax, the tax subsidy amounts to 50 cents per gallon of ethanol. (See p. 4.)

At the request of Senators Charles H. Percy, David Durenberger, and J. James Exon, GAO gathered data on some of the costs and benefits associated with the gasohol and related tax incentives. In particular, GAO addressed the

--importance of federal tax incentives to the domestic fuel ethanol industry,

--domestic economic effects of fuel ethanol production,

--net impact of the incentives on the federal budget,

--international trade impacts associated with fuel ethanol production,

--fuel ethanol industry's impact on national energy security, and

--federal tax subsidies to other energy industries. (See p. 6.)

IMPORTANCE OF INCENTIVES

GAO found that federal tax incentives have been vital to the establishment and development of the domestic fuel ethanol industry. Without a subsidy, ethanol cannot compete with gasoline at

BY THE U.S. GENERAL ACCOUNTING OFFICE

Report To The Honorable Charles H. Percy, David Durenberger, And J. James Exon United States Senate

Importance And Impact Of Federal Alcohol Fuel Tax Incentives

Federal tax incentives have been, and continue to be, vital to the growth of the alcohol fuel (ethanol) industry. With these incentives, the industry increased production tenfold between 1979 and 1982.

The net impact of the incentives on the overall economy has been small. Specifically, total economic activity, employment and the nation's trade balance have not been significantly affected by ethanol production. The net impact on the federal budget is not large. The budgetary cost of the subsidy is at least partially offset by savings in agricultural price support programs due to the added demand for corn for ethanol production. Finally, ethanol production has marginally enhanced national energy security by displacing small quantities of imported oil.

Balancing the incentives' costs and benefits, GAO believes that sufficient justification exists to continue the incentives until their current scheduled 1992 expiration date.

GAO/RCED-84-1
JUNE 6, 1984

current prices and would not be used as a fuel. The best available ethanol production cost data indicates that at the time of our review, the 5-cent tax exemption may have been somewhat higher than necessary to sustain profitable operations by some existing producers. However, it is likely that the current subsidy was and is necessary for new producers to successfully enter the industry and expand the industry's production capacity. (See p. 8.)

At this time it is difficult to determine how long the fuel ethanol industry will be dependent on federal subsidies. Such a determination depends heavily on future oil prices, corn prices, technological development, and other factors which cannot be reliably predicted.

DOMESTIC ECONOMIC EFFECTS AND FEDERAL REVENUE IMPACTS

From virtually any perspective, the fuel ethanol industry has had only a modest impact on the U.S. economy. Fuel ethanol production met only about one-fifth of 1 percent of gasoline demand in 1982 and is projected to meet only about 1 percent of gasoline demand by 1990.

Accordingly, while economic impacts on certain localities could be significant, the industry's impact on national output, employment, agricultural prices, and the federal budget is very small. For example, concerning the federal budget, GAO found that in 1982 the incentives resulted in about a $100 million tax loss to the Treasury. This loss was at least partially offset by reduced agricultural support program costs attributable to the ethanol industry's demand for corn. Because the industry's impact on total national output and income cannot be precisely calculated with available information, it is not possible to calculate the industry's impact on tax revenue. Consequently, it is impossible to conclusively determine the industry's net revenue impact. In any case, the impact is not large. (See p. 20.)

INTERNATIONAL TRADE IMPACT

Like the industry's domestic economic impact, small ethanol production levels suggest a modest impact on the nation's international trade balance. GAO found that in 1982 fuel ethanol production and use reduced oil imports and increased the value of agricultural exports by raising their prices, but also increased fuel ethanol imports. Considering these factors alone, domestic fuel ethanol production and use resulted in about a $210 million improvement in the nation's nearly $43 billion merchandise trade deficit. However, there may be other trade impacts GAO could not quantify which would reduce or reverse this modest improvement. (See p. 31.)

IMPACT ON NATIONAL ENERGY SECURITY

Domestically produced fuel ethanol enhances national energy security by reducing U.S. dependence on imported oil from the Middle East and other politically unstable regions. However, as with the industry's domestic economic and international trade impacts, fuel ethanol's impact on national energy security is small because the industry's current and projected output represents only a small fraction of gasoline demand. (See p. 37.)

GAO found that stockpiling fuel ethanol in a manner comparable to the Strategic Petroleum Reserve could somewhat enhance the role of fuel ethanol in reducing U.S. vulnerability to an oil supply disruption. However, while GAO's exploratory analysis indicated that ethanol stockpiling could be feasible, its cost effectiveness would be questionable. (See p. 42.)

OTHER ENERGY INDUSTRY TAX BENEFITS

GAO found that the total value of tax subsidies received by conventional energy industries such as oil and gas have historically dwarfed that received by the fuel ethanol industry and other conservation and alternative energy sources. Projections prepared by the Joint Committee on Taxation suggest that through at least 1988 conventional energy industries will continue to receive the vast majority of total energy tax subsidies although on a per barrel basis, the subsidies provided the oil and gas industries are not as large as the ethanol subsidy.

GAO points out the large value of the subsidies provided to conventional energy industries to demonstrate that fuel ethanol does not compete in a free energy marketplace. (See p. 49.)

The administration has opposed federal fuel ethanol tax incentives because such incentives distort the energy marketplace and contribute to a misallocation of economic resources. Recognizing the tax incentives offered to encourage production by conventional energy industries, this argument could just as easily be applied to these incentives. Not to do so seems somewhat inconsistent. (See p. 53.)

CONCLUSIONS AND OBSERVATIONS

Based on its assessment of currently identifiable costs and benefits surrounding the federal fuel ethanol tax incentives, GAO believes it would be appropriate to continue these incentives until their 1992 scheduled expiration date. The private sector has invested considerable sums of money in fuel ethanol plants--total plant value exceeds $1 billion--with the expectation that the market created by the tax exemption in particular would be present until 1992 when the exemption is scheduled to expire. Removing the incentives at a time when ethanol remains uncompetitive with gasoline could be viewed as a break in faith that would not be justified by any expectation of major budget savings or significant economic gains. GAO believes, however, that an increase in the incentives would not be justified because combined federal and state incentives are adequate to make ethanol competitive. GAO further believes that the need for the incentives should be periodically reviewed. If relative costs between gasoline and ethanol narrow appreciably, federal subsidies would no longer be essential. (See p. 55.)

AGENCY COMMENTS

GAO provided drafts of this report to the Departments of Agriculture, Energy, and the Treasury for official comment. The Department of Agriculture chose not to provide comments. The Department of Energy generally agreed with our findings and conclusions while the Department of the Treasury disagreed with our principal conclusion that the tax incentives should continue until the scheduled expiration date. Treasury's primary objections to our conclusion are that (1) oil and gasoline price decontrol made the incentives obsolete and (2) the marketplace is the most efficient allocator of economic resources and incentives such as those provided to alcohol fuels distort that marketplace.

GAO believes that strict application of marketplace economic theory does not take into account (1) the potential long-term economic value of supporting a new industry over a short period of time, (2) the national security advantages which could accrue to building an industry capable of producing an alternative automotive fuel, (3) the importance of the government meeting its commitment to individuals and businesses that have invested in fuel ethanol plants with the expectation that the federal incentives would be in place through 1992, and (4) the significant distortions which have already been made in the energy marketplace by tax incentives to conventional energy industries. (See p. 56.)

Contents

Page

DIGEST i

CHAPTER

1 INTRODUCTION 1
  Background 1
  Federal financial incentives to fuel ethanol industry 4
  Objectives, scope, and methodology 6

2 IMPORTANCE OF FEDERAL TAX INCENTIVES TO THE FUEL ETHANOL INDUSTRY 8
  Incentives vital to industry establishment and early growth 8
  Current incentives needed to expand industry 10
  Current incentives possibly larger than necessary for some existing producers 13
  Future need for incentives uncertain 15

3 DOMESTIC ECONOMIC EFFECTS OF FUEL ETHANOL PRODUCTION 20
  Output and employment associated with ethanol production 20
  Agricultural sector impacts 24
  Impacts on federal revenues 28

4 INTERNATIONAL TRADE IMPACTS AND IMPLICATIONS 31
  Ethanol production had small impact on trade balance 31
  Fuel ethanol production at heart of two trade disputes 35

5 FUEL ETHANOL'S IMPACT ON NATIONAL ENERGY SECURITY 37
  Current and projected ethanol production minimally enhances national energy security 37
  Fuel ethanol reserve probably feasible, but cost effectiveness is questionable 42

6 TAX EXPENDITURES BENEFITTING OTHER ENERGY INDUSTRIES 49
  Energy tax incentives and associated revenue losses 49

CHAPTER		Page
	Administration viewpoint on ethanol incentives seems inconsistent	53
7	CONCLUSIONS, OBSERVATIONS, AND AGENCY COMMENTS	55
	Conclusions and observations	55
	Agency comments	56
APPENDIX		
I	Organizations contacted during our review	59
II	Assumptions and analytical approach used in preparing SAFURE cost comparison	62
III	Letter dated February 8, 1984, from the Assistant Secretary for Management and Administration, Department of Energy	65
IV	Letter dated February 6, 1984, from the Assistant Secretary (Tax Policy), Department of the Treasury	66

ABBREVIATIONS

BEA	Bureau of Economic Analysis
BLS	Bureau of Labor Statistics
DOE	Department of Energy
EEC	European Economic Community
FAPSIM	Food and Agriculture Policy Simulator
GAO	General Accounting Office
GATT	General Agreement on Tariffs and Trade
SAFURE	Strategic Alcohol Fuels Reserve
SPR	Strategic Petroleum Reserve
USDA	U.S. Department of Agriculture

[Remainder of report retained in subcommittee files.]

Mr. DORGAN. Ladies and gentlemen, we are going to call the hearing to order this morning. The hearing today, in Sioux Falls, is a hearing of the Subcommittee on Oversight of the House Ways and Means Committee, and we are here in Sioux Falls to conduct a hearing on the subject of alcohol fuels, tax treatment of alcohol fuels, the consequences of various tax changes on the future of the alcohol fuels industry, and related topics.

My name is Congressman Byron Dorgan; I am from North Dakota, and serve on the House Ways and Means Committee.

With us today will be Congressman Andy Jacobs from the State of Indiana, and he will arrive shortly.

And Congressman Tom Daschle from the State of South Dakota. Let me mention at the outset, that although Congressman Daschle is not on the House Ways and Means Committee, he is on the House Agriculture Committee, and has been the most significant spokesman and the most persuasive spokesman on behalf of alcohol fuels in the U.S. Congress over the last 4 or 5 years. And we are pleased to have him join us on the panel today.

Just a couple of quick details. With us also today are two staff people from the House Ways and Means Committee—Janice Mays—Janice is an energy expert, among other topics; and also Beth Kuntz, who works for the Oversight Subcommittee of the House Ways and Means Committee. I point them out to you to let you know that if you have some questions as this hearing progresses, or need some information, feel free to get in touch with them and to visit with them about it.

The hearing record for this hearing will remain open until August 17 and that means you can submit additional information prior to that time.

Today we are taking testimony with four panels of witnesses and the testimony of the individuals on the panels will be limited to 5 minutes. We will appreciate if you would summarize your testimony and present it in 5 minutes, and that way there will be some time for questions and answers, and we can have a full and complete hearing.

With the four panels, we would expect, starting at about 10 o'clock, we would expect to complete this hearing around 2 o'clock this afternoon.

And we would appreciate very much your cooperation in shortening the verbal statements. We will have your full statements as a matter of hearing record and if you'll keep your statements short, we will be able to have the kinds of questions and answers that we would like to have at these kinds of hearings.

Let me just say at the outset in about 30 seconds, that the reason we are holding this hearing is that many of us in Congress and especially myself, on the House Ways and Means Committee, feel that the alcohol fuels industry is very, very important to this country. And it is an industry that I think has exciting and great growth potential.

But we need an interlocking of public policy and private policy to see that happen, to see that potential develop.

I think the extraction of alcohol from grain products in this country makes good sense for agriculture, produces broad, vast markets for our farmers, and also it makes good sense for this country's energy future, and we need to figure out how to get about the business of allowing this industry to achieve its potential, and quickly.

And that is why we are here.

Now, let me—for an opening statement, turn to Congressman Tom Daschle from South Dakota who, as I said, is, I think, bar none in the U.S. Congress—the House and the Senate—the person who has worked hardest, put in more hours and more effort, to try and bring about a successful alcohol fuels industry and a successful public policy to foster alcohol fuels, than any other person in Washington, DC.

And for that reason, and others, I'm proud to be with Tom here in South Dakota today.

STATEMENT OF HON. THOMAS A. DASCHLE, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF SOUTH DAKOTA

Mr. **Daschle**. Mr. Chairman, thank you very much for that introduction. I know I speak for the entire South Dakota congressional delegation and for everyone in South Dakota in welcoming the Ways and Means Committee to Sioux Falls. It's a high honor for us to have the Ways and Means Committee and the Renewable Fuels Association here.

South Dakota has been a booster of the alcohol fuels movement since the very beginning and we're excited about the growth we've seen, the potential we continue to see, and the opportunities which exist. In the last 10 years, we know that we've faced energy crises, we realize that Washington has not responded as it should have to the kinds of difficult problems we're facing with energy dependence.

We now face some problems as we look to the environment. EPA is expected to soon recognize that lead is one of the greatest causes of the problems we face within the environment, and as a result, will soon be phasing lead out.

We see just another need for an alcohol fuel industry in this country to respond to the problems that we have environmentally and to the dependence that we continue to have on international sources of fuel. But primarily, as one who represents farm country, as one who serves on the House Agriculture Committee, I see alcohol fuels as an opportunity for growth unlike anything we've seen in agriculture for tens and tens of years.

I think that farmers ought to be the producers not only of food, feed, and fiber, but fuel as well. We see this as our growth opportunity, as our growth industry, and South Dakota could be at the very heart of that movement. As we look to the next farm bill, rather than continue to find ways in which to bring down supply, to pay our farmers not to produce, to make them less productive, my hope is that we can create a demand oriented farm program next year to encourage our farmers to produce all that we can, not at a price that is below their cost of production, but at a price with a profit.

That is our opportunity, and as Byron said, I think the most important thing we need to do is to meld public policy with the potential that we find in the alcohol fuels movement today. In the last couple of years, we've seen expansion beyond anything ever dreamed of and I think that is going to continue.

This hearing is important in that regard, and I'm grateful that you could come and share this most important time with us today. Thank you.

Mr. DORGAN. Thank you Tom. We are going to call the first panel of witnesses and in doing so, let me again stress brevity. We want to have a complete hearing. I know many of you have traveled many miles, but by the same token we want to finish it on time.

Permit me one 30-second description of brevity. When I took journalism in college—I have a minor in journalism—I was told about the news reporter who came into the editor's office, and the editor said, we're hiring you but the approach here is brevity. Everything needs to be short. His first story was: Man looked up empty elevator shaft to see if it was coming. It was. Age 49.

With that in mind, let me call on the first panel, American Energy; all right, I'm sorry, the first witness will be Dr. Thomas Dobbs. So we have our witness, and then four panelists, Dr. Thomas Dobbs, professor of economics, South Dakota State University. Dr. Dobbs, welcome. We're pleased that you could join us this morning, and we will incorporate your entire statement in the record, and we would ask that you summarize for us.

STATEMENT OF THOMAS L. DOBBS, PH.D., PROFESSOR OF ECONOMICS, SOUTH DAKOTA STATE UNIVERSITY, BROOKINGS, SD

Mr. DOBBS. Thank you, Congressmen, for inviting me to participate in this hearing. We have been very interested in fuel alcohol development at South Dakota State University over the past 6 years, where we have had an active multidiscipline research program, in part with a small-scale alcohol plant located on the campus.

This research has been funded by the SDSU Agricultural Experiment Station and the U.S. Department of Agriculture, primarily. But I do wish to say at the outset that the views expressed here in my remarks do not necessarily represent either institution and, in fact, I do not really intend, myself, to advocate any particular policy on fuel alcohol tax incentives.

What I would like to do now is just briefly summarize from my written statement, some of the economic implications of the fuel alcohol tax incentives.

The current tax incentives have proven effective in stimulating major growth in the Nation's fuel alcohol production, although the very ambitious targets established 4 years ago have not been achieved.

Annual production did climb, however, from about 80 million gallons in 1980 to an expected 450 million gallons per year at the present time.

Now, it's quite clear that this expansion of fuel alcohol production would not have been economically feasible without substantial Federal or State subsidies. Although oil prices rose eightfold between 1973 and 1981, they have not reached levels at which fuel ethanol would be economically competitive without the subsidies.

Cost estimates vary, but some recent sources indicate that anhydrous ethanol produced from large-scale plants with $3 per bushel corn would probably cost about $1.75 per gallon. From small-scale plants, perhaps the cost would be $2 or more per gallon, although our research at the university has indicated ways of cutting costs below that level. Some of the already-established wet milling plants providing much of the existing alcohol probably produce at a lower cost, perhaps for about $1.40 per gallon.

Anhydrous alcohol has ranged in price over the past few years from about $1.60 to $1.80 per gallon in the Midwest. This has been about an 80-cent per gallon higher price than unleaded gasoline at the wholesale level, reflecting the Federal and State tax exemptions.

This difference has been sufficient to induce the ethanol expansion by large-scale plants that we have observed in the United States over the last few years. Small-scale plants have encountered numerous technical and economic difficulties, however, which I elaborate on in my written statement.

Decisions about continuation or alteration in fuel alcohol tax incentives, like most policy decisions, involve some economic trade-offs. On the plus side, we have a boosting of farm prices and incomes, as a result of the ethanol demand, and some degree of energy independence that's been fostered. On the negative side, we, of course, have reduced Federal and State tax revenues.

On the plus side, a recent estimate indicates that a half billion gallon ethanol industry—which would have required about 2½ percent of our corn crop in 1981 and 1982—probably adds about 6 cents per bushel to the price of corn.

Ethanol's contribution to U.S. energy independence, however, has thus far been limited. A 1-billion gallon industry, which would be about twice this year's production, would equal 1 percent of our annual gasoline consumption, which would substitute for about 30 million barrels of imported oil.

These are the pluses: some degree of energy independence, a strengthening of farm prices.

What about the negative aspects? The ethanol produced and sold in the United States this year will probably cost the U.S. Treasury about $225 million through highway tax exemptions and income tax credits and some additional amount in terms of energy investment tax credits. However, this revenue loss is at least partially offset by savings in agricultural support programs that are made possible because of strengthened commodity prices.

On the State level, however, State governments are increasingly concerned about the impact of their gasohol tax exemptions on highway funds. South Dakota's exemption is currently 4 cents per gallon, costing about $800,000 a year to our highway fund.

We are likely to see a number of States phaseout or reduce their alcohol tax exemptions over the next few years. This could deal a significant blow to hopes for further expansion in the ethanol industry unless the Federal exemption continues to be increased.

Congress will need to weigh these economic trade-offs. It would seem, however, that the Federal Government has made a moral commitment to existing fuel alcohol plant owners to continue the highway tax exemptions at least through 1992, as called for in the Crude Oil Windfall Profit Tax Act.

If further expansion in fuel alcohol production is deemed to be in the national interest, then continuation of the subsidies will be needed at least into the early 1990's, I feel. Moreover, research needs to be funded and continued on alcohol and a wide range of liquid energy alternatives, if we are serious about developing petroleum substitutes. Thank you.

[The prepared statement follows:]

STATEMENT OF DR. THOMAS L. DOBBS, PROFESSOR OF ECONOMICS, SOUTH DAKOTA STATE UNIVERSITY, BROOKINGS, SD

I wish to thank the Subcommittee for inviting me to participate in this hearing. We have been vitally interested in fuel alcohol development at South Dakots State University (SDSU). A multidiscipline research effort has been underway there for the past six years, based in part upon a small-scale alcohol plant located on the campus. SDSU's Agricultural Experiment Station and the U.S. Department of Agriculture (USDA) have funded this research. I must state at the outset, however, that the views expressed in this paper do not necessarily represent those of either SDSU or the USDA. Moreover, it is not my intention to advocate any particular course of action regarding fuel alcohol tax incentives.

Background

Current Federal and State tax incentives for fuel alcohol production were enacted following oil price shocks in the 1970s. The most significant of these incentives is waiver of a portion of the Federal excise tax on highway fuel for gasohol (fuel that is at least 10 percent alchohol), coupled with similar partial waivers of State fuel excise taxes in many States. The current Federal exemption—resulting from the Energy Tax Act of 1978, the Crude Oil Windfall Profit Tax Act of 1980, and the Surface Transportation Assistance Act of 1982—is $.05 per gallon of gasohol (out of the $.09 per gallon applicable to gasoline). On a per gallon of ethanol basis, this amounts to a $.50 subsidy. The Tax Reform Act of 1984 raises the exemption to $.06 per gallon of gasohol, beginning in 1985. The exemption extends through 1992.

Corresponding incentives in the form of income tax credits exist for businesses using or selling ethanol straight or in blends; such ethanol is normally hydrous (less than 200 proof). These credits are currently $.50 per gallon ($.60 beginning in 1985) for ethanol of 190 or higher proof and $.375 ($.45 beginning in 1985) for 150 to 189 proof ethanol. The excise tax exemption and income tax credit provisions are structured to prevent a given quantity of ethanol from benefitting by both.

More than half of the States exempted gasohol from at least part of their highway fuel taxes in 1983. Exemptions ranged from $.01 to $.11 per gallon of gasohol. In South Dakota, the exemption is currently $.04 per gallon. Federal and State excise tax exemptions for gasohol sold in South Dakota currently combine to total $.09 gallon of gasohol, or $.90 per gallon of alcohol. This appears to be close to the average for States in which most of the gasohol is sold.

In addition to exemptions and credits on fuel ethanol sale and use, a 10 percent business energy investment tax credit—over and above the regular investment tax credit—is still available for certain types of biomass property. Currently, ethanol plants must use biomass as the primary boiler fuel source to qualify for this tax credit.

These tax incentives, together with loans, loan guarantees, and other programs, were meant to foster achievement of U.S. alternative energy production goals. As of 1980, when annual ethanol production was about 80 million gallons, annual production was targeted at 920 million gallons by the end of 1982 and 11 billion gallons by 1990.

The tax incentives have proven effective in stimulating major growth in the Nation's fuel alcohol production, although the very ambitious targets established four years ago are not being achieved. Annual ethanol production climbed to 210 and 375 million gallons in 1982 and 1983, respectively, according to the firm Information Resources, Inc. It is expected to reach 450 million gallons in 1984.

Economic feasibility

It is quite clear that this expansion in fuel alcohol production would not have been economically feasible without substantial Federal or State subsidies. Although nominal oil prices rose eight-fold between 1973 and 1981, they did not reach levels at which fuel ethanol would be economically competitive without subsidies. The decline and subsequent stabilization of oil prices since 1981 has cast further doubt about the chances and timing of fuel alcohol successfully competing without subsidies. Current Department of Energy projections indicate relatively stable oil prices (in real dollars) until the late 1980s. Prices, in 1983 dollars, are expected to rise from $29 per barrel in 1983 to $37 in 1990 and $50 in 1995. Of course, as the 1970s price shocks taught us, these projections could become dated overnight.

Various estimates of fuel alcohol production costs are available. Estimates vary somewhat, however. Detailed research on small-scale plants has only been conducted in a few instances (at places such as SDSU), and cost information for most private, large-scale plants is considered confidential. Anhydrous ethanol produced from $3.00 per bushel corn in newly constructed, large-scale, dry milling plants probably costs around $1.75 per gallon. Ethanol from a typical small-scale plant (100,000 to 250,000 gallons per year) would perhaps cost $2.00 or more per gallon of 180–190 proof product, when corn costs $3.00. (Our research at SDSU does demonstrate ways of reducing costs below that level, however.) Already established wet milling plants can no doubt produce ethanol at costs lower than these; their costs may be around $1.40 per gallon of anhydrous alcohol.

Anhydrous alcohol has ranged in price from around $1.60 to $1.80 per gallon in the Midwest over the past few years. The price has generally been around $.80 per gallon higher than that for unleaded gasoline at the wholesale level. This difference reflects, roughly, the combined Federal and average State-level excise tax exemptions per gallon of ethanol. In other words, anhydrous ethanol has commanded $.80 or so per gallon more than would have been possible without the Federal and State excise tax exemptions on gasohol. This difference has been sufficient to induce the ethanol expansion by large-scale plants observed in the United States thus far.

Small-scale plants have not fared so well. Many have had difficulty producing an anhydrous product. Uses of hydrous alcohol are thus far limited. Moreover, the general lack of State-level subsidies for this product means that plants get only $.50 or less per gallon in subsidy (via the income tax credit provision), rather than the $.80 or $.90 that is typical for large plants producing the 200 proof product which goes into gasohol. As a result of technical difficulties, high interest rates, limited markets (at least until recently) for hydrous alcohol, and lower per gallon subsidies than are available to plants producing anhydrous alcohol, small-scale plants are currently making very little contribution to the Nation's alcohol production. This has been a disappointment to small communities concerned about rural development.

The 1985 increase in the Federal higway fuel tax exemption for gasohol from $.05 to $.06 pr gallon will and some strength to ethanol prices, to compensate in part for weakening over the past year of unleaded gasoline prices (to which ethanol prices are pegged). Whether this will provide sufficient market strength and investor confidence to encourage continued new ethanol plant investments remains to be seen.

Policy consideration

Decisions about continuation or alternation in fuel alcohol tax incentives, like most public policy decisions, involve economic tradeoff considerations. On the plus side, the tax incentives boost farm prices and incomes and help foster some degree of independence from foreign energy sources. On the negative side, they reduce Federal and State tax revenues.

Several studies have been conducted to estimate agricultural price impacts of ethanol fuel production. Since methodologies and assumptions used in the studies differ, so do their estimates. Estimated price impacts are generally modest at less than 1 billion gallons of ethanol per year—a level which would have required about 5 percent of the U.S. corn crop in the years 1981 and 1982. One study indicates that 500 million gallons per year of ethanol production, a little more than is projected for 1984, adds $.06 per bushel to the price of corn. That same study indicates corn prices would be strengthened by $.15 per bushel if 1 billion gallons of ethanol were produced each year. Various other studies indicate a $.12 per bushel strengthening of corn prices if 2 billion gallons were produced annually.

Livestock and other crop prices and production are also affected by utilization of corn for ethanol production, of course. Taking various positve and negative price changes into account, one study shows net farm income increasing by 4 percent as a result of 500 million gallons of annual ethanol production. Another study indicates that 3.4 billion gallons per year of ethanol production could increase net farm income by 20 percent.

Ethanol's contribution to U.S. energy independence has thus far been quite limited. Production of ethanol in 1984 will constitute only one-half of 1 percent of U.S.

gasoline consumption. One billion gallons of ethanol would equal 1 percent of our annual gasoline consumption and could substitute for about 30 million barrels of imported petroleum. At $30 per barrel, this would constitute a $900 million reduction in imports.

What, then, about the negative aspects of these tax incentives? Ethanol produced and sold in the U.S. in 1984 will cost the U.S. treasury about $225 million through highway tax exemptions and income tax credits. This revenue loss is partially offset, however, by reduced agricultural support program outlays because of the strength added to commodity prices by ethanol demand. In South Dakota, the $.04 per gallon tax exemption on gasohol resulted in foregone State tax revenues of $.8 million in Fiscal Year 1983. This was about 1 percent of gasoline and gasohol excise tax collections that year. While this may not seem like a large amount of tax revenue, State governments are increasingly concerned about the impacts of gasohol tax exemptions on their highway funds. The deteriorating status of roads and bridges in rural America has intensified this concern. We are likely to see a number of States phase out or reduce their gasohol tax exemptions over the next few years. This could deal a significant blow to hopes for further expansion of fuel alcohol production, unless the Federal exemption continues to be increased.

Elected officials will need to weigh economic tradeoffs highlighted in these remarks and documented in more detail in various reports. It would seem, however, that the Federal government has some moral commitment to existing fuel alcohol plant owners to continue highway tax exemptions through 1992, as called for in the Crude Oil Windfall Profit Tax Act of 1980. If further expansion in fuel alcohol production is deemed to be in the national interest, then continuation of subsidies will be needed at least into the early 1990s. Moreover, research needs to be funded and continued on alcohol and a wide range of liquid energy alternatives if we are serious about developing petroleum substitutes.

REFERENCES USED

Dobbs, Thomas L., and Randy Hoffman. *Small-Scale Fuel Alcohol Production from Corn: Economic Feasibility Prospects.* South Dakota State University Agricultural Experiment Station Bulletin 687. Brookings, SD: June 1983.

"Fuel Alcohol Persists," *ACRES, USA*, p. 35. September 1983.

Hoffman, Randy, and Thomas L. Dobbs. *A Small-Scale Plant: Costs of Making Fuel Alcohol.* South Dakota State University Agricultural Experiment Station Bulletin. 686. Brookings, SD. September 1982.

Information Resources, Inc. Information received by phone from this Washington, DC based firm on July 2, 1984.

LeBlanc, Michael, and Anthony Prato. "Ethanol Production from Grain in the United States: Agricultural Impacts and Economic Feasibility," *Canadian Journal of Agricultrual Economics*, Vol. 31 (July 1983), pp. 223–32.

Meekhof, Ronald, Mohinder Gill, and Wallace Tyner. *Gasohol: Prospects and Implications.* U.S. Department of Agriculture, Economics, Statistics, and Cooperatives Service, Agricultural Economic Report No. 458. Washington, DC: June 1980.

U.S. Congress, "Crude Oil Windfall Profit Tax Act of 1980," Public Law 96–223. April 2, 1980.

U.S. Congress. "Energy Security Act," Public Law 96–294. June 30, 1980.

U.S. Congress. "Surface Transportation Assistance Act of 1982," Public Law 97–424. January 6, 1983.

U.S. Department of Energy, Energy Information Administration. *Synopsis of the Annual Energy Review and Outlook, 1983.* Washington, DC: May 1984.

U.S. General Accounting Office, *Importance and Impact of Federal Alcohol Fuel Tax Incentives.* Washington, DC: June 1984.

White, Herbert M. *A Review of Problems in the Small-Scale Farm Production of Ethanol.* Prepared by Mobile Systems Directorate, the Aerospace Corporation, for the U.S. Department of Energy. Washington, DC: July 1983.

Mr. DORGAN. Thank you, Dr. Dobbs.

Congressman Daschle, do you have some questions?

Mr. DASCHLE. Thank you, Mr. Chairman. Thank you, Dr. Dobbs, thank you for your statement.

I would be interested in pursuing the cost of alcohol production with you. You mentioned a cost of $1.40 to $1.75 a gallon. That was the cost of the production of the alcohol. Does that include as well the cost of the production of the distillers dried grain?

Mr. DOBBS. Yes, that includes both the cost and the credit for the distillers' dried grain, so that is a net cost. It includes the cost of the feed stock after netting out the value of the byproducts, which would include the distillers' grain and some other products in the large-scale plants.

Mr. DASCHLE. And you view the market cost of a gallon of ethanol right now to be what?

Mr. DOBBS. Well, cost of production, I'm saying, would probably be in this $1.40 to $1.75 range. The market price, according to the most recent quotations I've seen on 200-proof ethanol, is about $1.65, I believe in Decatur, IL.

Mr. DASCHLE. What would be in your opinion the market price of the distiller's dried grain that you'd get from a bushel of corn or wheat today?

Mr. DOBBS. I have not looked at those quotations recently, Congressman. The credits in our analyses have worked out anywhere from 30 cents to 60 cents per gallon of alcohol when comparing the byproducts to soybean meal—but I don't remember the exact market price of the distillers' grain itself.

Mr. DASCHLE. Would you say that you get several pounds of distiller's dried grain, about 17?

Mr. DOBBS. Yes; that's correct.

Mr. DASCHLE. Seventeen pounds. What would be the market value of 17 pounds of distiller's dried grain?

Mr. DOBBS. I think its 6 or 7 cents per pound.

Mr. DASCHLE. Six or seven cents a pound, so you're talking about $1 I suppose?

Mr. DOBBS. OK, pardon me. It doesn't work out to $1 per gallon of ethanol. I don't recall the exact figures, but it does come out to about 30 to 60 cents per gallon of ethanol, which is a wide range depending in part on whether the byproduct is wet or dry.

Mr. DASCHLE. So, in any case, it appears that if you would combine the alcohol and the distiller's dried grain market values, you'd be getting somewhere between $2 and $2.30 total market value of the two products. If your cost of production is $1.40, then you've got somewhere in the vicinity of 90 cents profit which would be roughly in the vicinity of 20 percent profit. Do my figures bear with what you would come up with?

Mr. DOBBS. Well, I think we're using somewhat different bases. I can quote you directly, if you wish, on some of the small-scale figures that we have estimated. The cost of production, in a small-scale plant, Congressman, is about $2.10, we figured—based on 1981 prices. This is the total cost, $2.10.

I think we're using a little bit different starting points when I am quoting my figures. Subtracting, on a wet basis, 30 cents per gallon for the sale value of the byproduct credit, gives the net cost—now this was at $2.50 corn—about $1.80 per gallon. So, the $1.40, $1.50, $1.75 figures mentioned earlier are after netting out the byproduct credits. Yes.

Mr. DASCHLE. That's after netting out the byproduct credits.

Mr. DOBBS. I'm sorry for the confusion on that.

Mr. DASCHLE. And does that include the current investment tax credit?

Mr. **Dobbs.** No, that does not. But in our figures, that only took off 3 or 4 cents per gallon. With a small-scale plant, many of the costs are in labor and feed stocks, rather than in capital, per se. So that did not save very much in the overall figures, only another 3 or 4 cents.

Mr. **Daschle.** I'm glad you made the point. I only make this as a parting comment: while there was a negative reduction in the tax exemption for the highway trust fund, there's a real positive gain to be made and recorded in the lack of additional funds put out through the farm program itself through subsidies. Obviously, those subsidies are extraordinarily expensive, especially when we pay our farmers significantly not to produce as we did with PIK last year.

Some $18 billion was spent on the PIK program and that makes this $225 million pale by comparison. I think that's an important part to be made as part of the record.

Dr. Dobbs, thank you very much for your testimony.

Mr. **Dorgan.** Dr. Dobbs, I have just one question. You are an economist, and you study and analyze public and private investment, and what we're talking about here today is the value of public investment and private investment in alcohol fuels industry, and virtually every industry that you can think of in this country has had some kind of public investment, some kind of Government assistance in the origination of that industry: Airlines, for example, the oil industry. Anyone who thinks the oil industry doesn't have substantial public investment today through our Tax Code is just dead wrong.

The question is what will we do now with respect to alcohol fuels in our Tax Code as a public investment. I sat across the table from John Block one day, the Secretary of Agriculture, and he said, when I asked him the question: "Well, what about being more aggressive in the tax code, what about being more aggressive in B&I loans in order to provide the incentives here, to get this industry on its feet and underway?"

John Block said, "If the alcohol fuels industry is to make it and to grow, it'll happen. It'll happen just because the private sector wants it to happen. And if that doesn't happen, then it shouldn't happen."

I said, "Well, if that were the mentality around Washington, DC, in the 1930's, they'd still be using candles on the farms in the Midwest." I mean, there are a lot of things that have happened in this country that are good because we made certain they happened; we saw that they were in the public interest and the private interest of this country and we put together a plan that provided a springboard so that it did happen.

In your judgment, what would happen if we backed off completely and we said, no tax exemption, no loan programs, nothing, for alcohol fuels, and used the Agriculture Secretary John Block's approach, just to say, well, if it's going to happen, it'll happen and we don't need any public incentive there. What would be the fate of the alcohol fuels industry in the near term in your judgment?

Mr. **Dobbs.** I think it's quite clear that in the near term of the next 5 to 8 years, there would be no further growth in the alcohol industry. The current price of petroleum is about $30 a barrel, as you know, imported. The cost figures that we're talking about, regardless of whether we use the high end or the low end of the range I referred to, would require oil to be probably $45 to $60 a barrel for ethanol to compete on its own at this point in time.

The current DOE projections are for oil prices to be relatively stable for 4 or 5 years, although, as we know from past experience, that could change overnight. But, in any event, prices may not rise very much until the late 1980's and into the 1990's. So, I think it's clear that the ethanol industry would not expand at the present time unless we had a major oil price shock that convinced investors that the price would stay up.

I think that with all alternative fuels, that difficult choice that you're outlining is there. In an infant industry case, like this, if we're going to develop any alternative fuels, there are going to have to be some inducements in the early years. The difficult choice, however, involves knowing which energy sources may be economical beyond that infant industry period and being careful not to lock in some subsidies that make the industry permanently there even if it can never stand on its own feet. That's the difficult choice.

Mr. Dorgan. Well, you make some excellent points, and we appreciate your testimony having the positives and the negatives with which to analyze the development of this industry.

And Dr. Dobbs, we thank you very much for coming.

Mr. Dobbs. Thank you.

Mr. Dorgan. Next, we'd like to call on a panel comprised of Ken Stofferahn, representing American Energy, Inc., of Forman, ND. Ken is a member of the South Dakota Public Service Commission and a special adviser to the Board of American Energy.

We have Dawn Enterprises, represented by Leon Dubourt, from Walhalla, ND. Leon is president of that.

Ultrasystems, Mr. Robert P. Kennel, vice president.

Agri-Energy, Ed Wilkinson, president.

Wayne Nelson, president of the Nelson Farming, Inc., in Winner, SD.

Could you gentlemen come up and approach the table?

Let me amend that, Clayton Litchfield, American Energy.

If we might begin, let me take them in this order: American Energy, Ultrasystems, Dawn Enterprises, Agri-Energy and then Wayne Nelson. We'd start off with Clayton, representing American Energy, Inc.

STATEMENT OF CLAYTON LITCHFIELD, EXECUTIVE SECRETARY, AMERICAN ENERGY, INC., FORMAN, ND

Mr. Litchfield. Thank you, Congressman. Yes, I am Clayton Litchfield, not Ken Stofferahn. I'm here today, and I'm pleased to submit the testimony that I have to the panel.

I'm here representing, first of all, myself as a farmer. And second, the secretary of American Energy, which is an 1,140-member-farmer cooperative organized in the tristate area and we do have members in the Sioux Falls area, of North Dakota, South Dakota, and Minnesota.

We have been working for the last 5 years, as you well know, in pursuing the financing and diligently working on putting together a 50 million gallon fuel ethanol plant, in the Wilmer, MN area.

This has finally culiminated, or its taken the turn of turning into a joint-venture partnership which what we've been pursuing in the financing was indeed obtained and we're ready to go. We've used a logical approach on our attempt to get this project going, and conventionally farmers are supposed to build small plants and go broke, which they have.

And industry is supposed to build large plants and make a lot of money, which they have.

Well, in our case, logic really has not prevailed because, as of June 26, our project has been shelved. And again, it took the form of a joint venture between American Energy, this group of farmers, and Ashland Oil. And the reason that Ashland decided to pull out, and I want to state it right up front and in the correspondence that we had with them, was that the first reason in them pulling out was the fact that the energy investment tax credit was not extended past 1985.

Now, that's got a direct bearing, you know. And it's the second time in American Energy's history that the rug was pulled out from under them because of the policies of our Federal Government. I think frustration is the word that sums up my testimony today.

I'm frustrated as a farmer; frustrated as a voter; I'm frustrated as a taxpayer. I listened to the previous correspondents here between you and the good Doctor, and you're talking about costs. Well, let's talk about how much this costs the country.

How can it cost the country anything when you're doing business with yourself? That's the point that I'd like to make. And as a frustration from the standpoint of a voter, I'd—you know, it, it just goes deeper than that. The failure of our government—and I say government because it's not this administration or last administration, it's the "comme ci, comme ca" attitude toward projects like this. It's a want-and-see, don't-know, you know. You asked a very pertinent question, you know.

What would happen if that took place? How can the private sector ever get where it's going with the "comme ci, comme ca" attitude of our government? Now, that's the thing that really frustrates me. It's no wonder that, when on a recent trip, Governor Perpick over here made to Japan, the comment, when he was trying to illustrate this Nation's farm problems and all its gigantic problems, he was stopped short when he said, this Nation's problems are all in your head.

Because that's where it is. You know, what other nation wouldn't give to have a renewable food and energy system like we have got here in this country? We have got the greatest one in the world. And what are we doing with it?

What are we doing with it. Instead of rewarding these, the most efficient people on Earth for their ability to produce the food and energy of not only this country but the world, they're on the brink of extinction because of the policies coming from our Government. That's got to stop.

Not only the House Ways and Means Committee, but all the committees cannot continue to go through this and play politics with this Nation's future.

They have to take the blinders off; because it's your committee and its the Agricultural Committee and it's all of these committees that have to be committed to this Nation's future.

Where's the plan? Where's the plan that we, that this Nation has? You know, as a voter, the frustration goes even deeper. How can we let ourselves be blackmailed? And that's what we are. Blackmailed by some Arab over there with a knife between his teeth. Just one bomb as you illustrated.

And what would happen? What's even worse is knowing that and not doing anything about it. Twelve years and we have not yet got an energy policy in this Nation.

The only energy policy that we have is that we don't have one. Now, that's the frustration, you know, that I have as I go through and look at this thing.

I'm frustrated as a farmer. I watched this $18 billion PIK program. That's the tip of the iceberg. What, what really was that? We took $18 billion and poured it down a rat hole. That's what we did. Thank the Lord for PIK, because, as a farmer, I wouldn't be able to be here today if it weren't for PIK. But how much better usage our money could be put to—$18 billion would have built 160 50-million gallon fuel ethanol plants and put in place a long-term solution to this problem. Once and for all. Not only that, but it was the tip of the iceberg. If you think $18 billion cost the taxpayers a lot of money, what we did is we shut down the revenue-producing sector of this country, and we eliminated that revenue at the raw-material level.

And when that didn't generate that money, as it went through the economy, it costs this Nation's consumer over $100 billion dollars of lost revenue, because we didn't produce the income.

Again, I repeat, how can we go wrong when we're doing business with ourselves. Have we forgotten what Abraham Lincoln told us? Have we forgotten when somebody wanted to buy cheap rails from England, and when Abraham Lincoln came back and said, "If we buy the rails from them, they'll have the money and we'll have the rails; if we produce them ourselves, we'll have the rails and the money." That's what we're talking about in fuel ethanol. That's what it is.

It's a peoples' program; it's one that shouldn't be in the hands of a select few people with their special interested group; it's a people's program that needs to be—it needs to be worked on by not only your committee but all committees because, in my opinion, gentlemen, it may be, there may be others but this is probably the only long-term solution to this Nation's problems. Thank you.

[The prepared statement follows:]

STATEMENT OF CLAYTON LITCHFIELD, EXECUTIVE SECRETARY, AMERICAN ENERGY, INC., FORMAN, ND

My name is Clayton Litchfield, and I am Executive Secretary of American Energy, Inc., a 1140 member farmer cooperative organized in the tri-state area of North Dakota, South Dakota, and Minnesota. This letter testimony is submitted on behalf of all of us as members and farmers in the hopes of providing some insight and direction to this nation's "energy policy" or probably more accurately stated establishing this nation's energy policy.

As some of you know, we have been working diligently to obtain the financing for our 50-million gallon fuel ethanol plant at Willmar, Minnesota. The farmers in American Energy, Inc. have spent over $4 million and 5 years pursuing this project and it has evolved into a joint venture partnership with Ashland Oil with Ashland lending the credibility of a current producer of ethanol (South Point Ethanol 60 MM gallon joint venture) and a current successful marketer. Financing has been obtained.

We have used a logical approach from the start of our project. Even though we have been logical, we have not been conventional.

Conventionally, farmers are supposed to build small plants and go broke, which they have, and industry is supposed to build large plants and make lots of money, which they have. Logic tells us to build a large plant.

Conventionally, fuel ethanol projects have looked to the government for loan guarantees. Logic tells us that with a good, sound project it is not needed. In our case, logic has not seemed to prevail.

Frustration is the only word that describes my feelings here today. Frustration as the Secretary of AEI because after all the time and effort and money that have been spent. As of June 26th our project has been shelved.

Attached is a letter from Ashland Development stating the reasons for suspending all activities relating to our project. The first one being the failure to extend the Energy Investment Tax Credit ("EITC") which in itself reduces the projects return below Ashland's desired level.

This frustration goes deeper than just our project. It is the overall attitude of our government when it comes to energy. I say "our government" because the attitude doesn't change from one administration to another. The failure to extend the EITC is just one of many signals coming from Washington which says, "wait and see", "don't know", "let you know later".

How can the private sector build a program when it never knows from one day to the next what direction it may take.

It's no wonder when on a recent trip to Japan, Governor Rudy Perpich was stopped short while explaining this nation's problems with the statement "America's problems are all in her head".

What other nation's wouldn't give to have the renewable food and energy producing machine that this country has its disposal. The most efficient and productive group of people on the face of the earth, few in numbers but economically representing two thirds as much as all industry combined and what are we doing with it? We have developed a policy to export our production at a price that is less than what it costs to produce it. We are not only giving away this nation's resources, but subsidizing our foreign competition in the process.

Frustration as a farmer: Instead of us being rewarded for our efficiency, because of it, we are being threatened with extinction.

The Payment in Kind (PIK) program has undoubtedly turned into the most expensive farm program that we have ever seen. A cost of over $18 billion with the sole purpose of reducing the nation's carryover of grain by 2 billion bushels. This is only the tip of the iceberg. What hasn't been said is that by idling 82 million acres, we have idled the revenue producing segment of our economy. Using 60 bushels to the acre at $3.80 per bushel, you have not generated $14.8 billion of potential revenue at the raw material level. $14.8 billion multiplied by a factor of seven as it moves through our economy represens a $104-billion loss of earned income, not borrowed money but earned income to the American people that could be used for such things as balancing a budget.

Let me propose a logical alternative. Again, with the end result of reducing the carry-over of grain by two billion bushels, why not build 160 50-million gallon fuel ethanol plants? To build and pay for them in one year would only require $16 billion, and look at the benefits:

Put in place a long-term solution to our even present "over-supply of grain" rewarding the producers for efficiency instead of punishing them;

Produce eight billion gallons of 200 proof high grade ethanol representing 9% of our estimated 1982 usage. This alone would result in an $8 billion difference in our balance of trade;

Produce 28.5 million tons of high quality protein feed in a condensed form readily marketable to protein-deficient nations. This would be an additional $4.5 billion to our balance of trade;

Create 192,000 direct and indirect construction jobs at the plant sites; and

Create 48,000 permanent operational and service related jobs.

This would keep the most efficient and productive sector of our economy in full production, generating an additional profit at the raw material level estimated at $4.9 billion. This multiplied by seven as it moves through the economy represents $34.4 billion of earned income that does not have to be borrowed and on which interest does not have to be paid and which income tax can be collected.

The sad part of the above scenario is that is hasn't been done and that a simple loan guarantee could put it all in place without costing the taxpayers one red cent.

Frustration as a voter: How can supposedly intelligent people that we have elected, living in the greatest country on earth, allow themselves to be blackmailed by a handful of people that can't even get along among themselves?

A better question would be knowing this and having the ability and the resources to change it, why haven't we done it?

Energy independence is a people's program. It does not belong in the hands of a few corporations whose self interest lies ahead of what's good for the country. Not only must we become energy independent but it must be from a renewable source. I can't tell you when we are going to run out of oil. 10 years, 50 years, 100 years? But I can tell you that we are going to run out!

RECOMMENDATIONS

1. Change your attitude. How can it be wrong to do business with ourselves no matter what it costs. Have we forgotten what Abe Lincoln told us when we built the transcontinental railroad and a few wanted to buy cheap rails from England to save money? "If we buy the rails from England, they will have our money and we will have the rails. If we produce the rails ourselves, we will have both the rails and the money". Why should we give away our children's inheritance when it could be put to so much better use.
2. Increase the exemptions to 9 cents. Federalize the exemption so that we eliminate the patchwork of state exemptions. Make a commitment.
3. Discourage the use of methanol.
4. Whatever it takes to develop and sustain a fuel ethanol industry must be done.

Don't play politics with this nation's future. Fuel ethanol is one of the few if not the only long range solutions to the problems facing our country today. Please us your authority to successfully move in this direction.

ASHLAND DEVELOPMENT, INC.,
Ashland, KY, July 2, 1984.

Mr. CLAYTON LITCHFIELD,
American Energy, Inc., Forman, ND

DEAR CLAYTON: This will confirm our telephone conversation of June 26 regarding Ashland's decision to cease operations on the Willmar alcohol plant. This decision came as a result of final management review of the package and reflected concern over a number of factors that were causing serious problems with project economics. I apologize for the sudden nature of the announcement, but it was necessary because of certain commitments made to Willmar officials for meetings later in the week. I called you as soon as I was advised of the decision.

As noted in our release, there are four areas that are having an adverse impact on the project. The immediate concern was over rejection by Congress of the EITC extension and the continuing rise in interest rates just at the time we would have to borrow substantial sums of money. The loss of EITC alone reduces the project return well below Ashland's desired level, and the higher interest rates further aggravate the debt service burden over the short time period we have placed on the payback.

In addition, trends in gasoline and corn prices over the past several months are having an effect on the credibility of our original assumptions. With gasoline, which serves as a basis for pricing ethanol, this year is unique in that prices have held a downward trend into the summer and, on the average, have dropped 14 cents per gallon over the past year. While there is no way to predict the future, the industry is generally ageed that it will take several years of business-as-usual to recover from this downward trend. As for grain, again this is a unique year, but the circumstances have forced a reassessment of the market; and we believe it is prudent to lower our expectations of Minnesota grain savings.

A preliminary analysis using the new assumptions indicates that any one of the above factors can reduce th return to an unacceptable level. If two or more of the factors are changed the return goes well below 15% and could not be given serious consideration by Ashland. We are in the process of finalizing these numbers, and Jay Hill will forward them to you in a few days.

Not mentioned, but also a critical factor, is the cost estimate being developed by Pritchard. As you know, we had commissioned Katzen and Pritchard to conduct new work to strengthen the estimate. Pritchard has just released some numbers to us that show a substantial increase in the capital requirement. Since we have not had an opportunity to review the work, it was not appropriate to make a point of any change in that area. However, if the amount has changed it could, in itself, be a deterrent to proceeding. We intend to complete the work with Pritchard so as to have a good estimate on record. We also have otner documented information about the project that you are welcome to have if you think that it would be useful.

I can asure you that this was a difficult decision on our part and sincerely regret having to take this action. We have spent considerable time and money over the last several months in anticipation of moving forward. I personally wanted to see the project succeed but fully realize the problems resulting from this current economic environment. We have certainly enjoyed working with AEI and hope that events will change and we can get together again.

Sincerely,

CHARLES D. HOERTZ, *President.*

Mr. DORGAN. Clayton, thank you very much for your very powerful and important statement.

Let me next call on Robert Kennel, vice president of Ultrasystems. Bob.

STATEMENT OF ROBERT P. KENNEL, VICE PRESIDENT, ULTRASYSTEMS INC., IRVINE, CA

Mr. KENNEL I'd like to thank the members of the House Ways and Means Committee represented here today, and especially to you, Congressman Dorgan and Congressman Daschle, who have been most consistent and valuable as supporters of alternate energy.

My name is Bob Kennel. I am a vice president with Ultrasystems. I've been asked to address the effect of Government policy on the ethanol market, and I'd like to share my own company's perspective on some of the other key issues facing the responsible growth of this industry.

Our company is one that puts the rubber on the road, makes it happen from a financial standpoint as well as an engineering construction standpoint.

We supply that responsible private-sector initiative that makes Government policies happen.

I'd like, in my brief time here, to cover five subject areas: One, who Ultrasystems is, so that you'd understand our prospective; two, where we see the overall renewal energy market in the United States; three, why we decided to enter that market; four, what we see is needed for the responsible growth of the ethanol market, and finally, how we're doing, using the 11.3 million gallon per year barley-to-ethanol plant, Dawn Enterprise's project at Walhalla, ND, as an example. In that latter regard, Mr. Leon Dubourt, will cover the specifics of the Dawn Enterprise project.

First, who is Ultrasystems? We're a medium-sized company, 15 years old, headquartered in Irvine, CA, we'll be doing well over $100 million worth of business this year, and we have well over $100 million in backlog for renewal energy projects alone. About two-thirds of our business is in energy and one-third in defense.

The uniqueness with which we entered the ethanol market—marketplace is perhaps twofold: First that we have a very broad alternate energy background—we work in wood, ethanol, small hydro, geothermal, coal, and cogeneration.

Second, we take the full systems approach toward putting projects in and making them happen from the conceptual design through the engineering, construction, arrangement of financing, ownership, and operations. We do part of our business in the traditional engineering construction role for clients such as Proctor & Gamble, and we do part of our business under our own project subsidiaries under names such as Ultrapower, Ultrasweet and in the case of Dawn Enterprises, Ultrafuel. Over the past 5 years, Ultrasystems has been the fastest growing construction company in the United States.

Where are the markets for alternate energy? I would want to say, unhesitatingly, that alternate energy is more important to this country than this country yet realizes.

It takes neither hindsight nor foresight to recognize the growing importance in the United States. Reality hit us in 1973 on the precarious nature of our oil import dependence, and it continues today with the equally precarious Persian Gulf situation.

Coal has not proved to be the energy panacea from both environmental and safety issues on the one hand, and synthetic fuel economic issues on the other. Natural gas is clean but is expensive and not everywhere available; there will be no new nuclear plants built in this country this century.

Alternate energy is probably the only place to go. Within alternate energies, I would focus today on biomass, which has been a misunderstood one of the alternate energies. It has been lumped, by the Government, primarily under the solar umbrella, but unlike all the other solar technologies, biomass is the one that has to have a supply/demand infrastructure with a commodity in the middle.

And whether you're talking about wood energy or whether you're talking about grain ethanol fuels, it's the commodity nature of biomass that has never been understood by the rest of the solar community.

The markets really are two places: there are only two things that the financial community in the United States is currently putting money on in the alternate energy area: one is electricity and the other is transportation fuels such as ethanol.

Legislation has been critical in both of those areas. Electricity generation has been predominantly through small hydro, wood, and geothermal. It took PURPA to open the doors, and it took the energy tax credits to allow the necessary financial margin for projects to go ahead.

For alcohol, the prepared material enumerates the legislative pieces that have been most important. I will not go back over those here; I think everyone is aware.

Geographically, the biomass markets are almost anywhere in the country. Where there's grain, there's not wood, and where's there's wood, there's not grain, but everywhere in the country has one of the two.

And this whole biomass market is also important because it is power production or ethanol production in rural America, which needs the boost.

Why are we in the market? Simply stated, we're small enough that it fits what we do well. We're smart enough to have our eyes open; we recognize that a touch of the glamor has been taken off the alternate energy market, but we're in it anyway; we are altruistic enough to realize that where something important is happening in the country, we'd like to be there; and if there is money that can be responsibility made, we want to be there especially.

So our whole company has emphasized getting involved in environmental issues, economic issues, energy issues, and responsible defense issues, affecting this country.

What's needed? Anybody knows we're not a fully developed industry yet. And I believe we need the following things:

First, clear national policy needs to be stated. Because there's already been a mixture of economic support elements for the ethanol industry, the administration and Congress need to define an overall energy policy with a clear recognition of alternate energy in general, and ethanol in particular. That policy must be consistent over time. It must be balanced in relation to economic incentives for other energy forms, and it must be articulated in clear language. We need to know the ground rules.

Second, there needs to be continued cooperation between agribusiness and the oil companies on the growth of the ethanol market. This is the first time in history that there has been such cooperation on transportation fuels; we need to complement it and we need to foster it further.

At the same time, the growing ethanol industry should not be dominated by either big oil or agribusiness. It still has grassroots, and a responsible complement of farmers and small and medium-sized businesses will be needed for a healthy growth.

Third, there needs to be continued education that the current oil glut is not a true condition of the future, and that the alternative energy industry development must be encouraged. Further, the ethanol industry must sell itself beyond the old patriotic "gasohol" image to be seen as the truly renewable fuel that results in environmental benefits, jobs creation, agricultural market stability, positive balance of payments, and oil backouts.

Fourth, there are a number of very specific government actions that need to be put in place and maintained for the continuity that the evolving industry needs.

The 1982 expiration date for the ethanol excise tax exemption must be maintained. The excise tax exemption should be raised high enough—8 or 9 cents per gallon—to allow the debalkanization of the States' exemptions for a more orderly national industry development.

Continued protection against foreign ethanol dumping is still needed. Stronger regulations or legislation on the lead phase-down need to be acted upon and articulated and announced as soon as possible.

A clear statement of policy on the Farmer's Home Loan Guarantee Program beyond fiscal 1984 is needed. A continuation of the energy tax credit beyond 1985 needs to be enacted for continuity and recognition of the several-year development cycle that are required on such projects.

Additionally, the Treasury Department needs to take another look at what are called the tax revenue losses. And House Ways and Means should do this too, for such current assistance as the energy tax credit.

A specific example: Ultrasystems has a subsidiary company called Ultrapower. We develop small powerplants around the country. The first one, in northern California, goes under operation this month. We have done an analysis on just the first 2 years of construction for that plant. We have found that for an 11-megawatt wood-fired powerplant that for each $1 in energy tax credit that we have taken down over these past 2 years, there have already been generated $3 in direct new tax revenues for that project. For a $1.56 million energy tax credit on the capital construction costs, approximately $2.5 million in new Federal tax revenues have been realized; and $2.1 million in new State and local tax revenues have been realized.

And beyond that, there are obviously continuing tax credits for the remainder of the 30-year lifetime of the plant.

Fifth, we know there needs to be continued research and development on the 5- and 10-year downstream fuel technologies; cellulose-to-diesel; cellulose-to-ethanol which I'm pleased to say our company is working on.

The primary purpose behind all of these needed actions is to give the financial community primarily an increased confidence in the future of alternate energy in general and ethanol in particular.

Finally, how's it working? The ethanol industry growth over the last 5 years has been dramatic. Our company has been working with other clients all this time, but this is the first time we have put our money where our mouth is, and our own rubber on the road, in conjunction with a joint partner, Dawn Enterprises in the project in Walhalla, ND.

I would like to end my formal testimony and turn it over to Leon Dubourt, to talk about the Dawn Enterprise project itself. Thank you very much for your kind attention.

[The prepared statement follows:]

STATEMENT OF ROBERT P. KENNEL, VICE PRESIDENT, ULTRASYSTEMS INC., IRVINE, CA

I want to thank the members of the House Ways and Means Committee and the Oversight Subcommittee represented here today, and especially Congressmen Daschle and Dorgan, who have been most consistent and valuable supports of alternative energy, for the opportunity to speak today on the importance of biomass fuels to our nation.

My name is Bob Kennel, and I am a Vice President of Ultrasystems Incorporated as well as Senior Vice President of its wholly-owned subsidiary, Ultrapower Incorporated. I have been asked to address the effect of government policy on the production and use of ethanol fuels, and I would like also to share my company's perspective on some of the other key issues facing the responsible growth of the alternate and renewable energy supply sector. What I have to say here today is basically my view, from personal involvement in the development of various alternate energy projects around the country over the past 7 years, of what is working and what is not.

In my formal testimony, I will cover five key subject areas:

Who Ultrasystems is, to better understand our perspective;

Where we see the overall alternate and renewable energy market in the United States;

Why we decided to enter the market;

What we see as needed for the responsible growth of the ethanol market; and

How we're doing, using the 11.3-million-gallons-per-year barley-to-ethanol Dawn Enterprises project in Walhalla, North Dakota, as a specific example.

The Dawn Enterprises example will be elaborated on in further testimony by Mr. Leon Dubourt, President of Dawn Enterprises, our Partner in the project.

WHO IS ULTRASYSTEMS

I'd like to begin with a little background on Ultrasystems and our involvement in the field of alternate energy and alcohol fuels. Ultrasystems is a rapidly-growing company, employing over 1,100 people and with some $76 million in net revenues last year. We are primarily an engineering and construction company with about two-thirds of our business in energy related projects and the other one-third in defense systems.

Ultrasystems has headquarters in Irvine, California, with numerous field offices around the United States. We are a 15-year-old engineering and construction firm with well over $100 M backlog in alternate energy projects. Our uniqueness in approaching the alternate energy marketplace has been our broad energy resource base (wood, ethanol, small hydro, geothermal, coal, and cogeneration) and our full "systems" approach (conceptual design, engineering, construction, financing, and operations).

Ultrasystems does part of its alternate energy business under the traditional engineering and construction role for clients such as Procter and Gamble and Federal Paperboard, and part of the business under our own subsidiaries such as ultrapower, ultrafuels, and ultrasweet. Over the past 5 years, Ultrasystems has been the fastest-growing Engineering and Construction company in the United States.

WHERE ARE THE MARKETS

It takes neither hindsight nor foresight to recognize the growing importance of alternate energies to the United States. Reality hit the United States in 1973 on the precarious nature of our oil import dependence, and it continues yet today with the current Persian Gulf situation. Coal has not proved an energy panacea with environmental and safety issues on one hand and synthetic fuel economic issues on the other. Natural gas is clean, but expensive and not everywhere available. No new nuclear plants will be started in the United States this century for both economic and environmental reasons.

The specific markets for alternate energy sources have thus been evolving over the past 10 years with tortuous twists and turns. They are being shaped by economic, environmental, and political forces of interdependent means. Of primary interest to this hearing, however, are the subsequent subsets within the alternate energy category. These subsets are renewable energy, and under that biomass, and under that ethanol.

From a government perspective, renewable energy was historically and often unthinkingly carried under the tag line of "solar" energy with the result that biomass markets had several years of lost opportunities. At the Department of Energy, for example, biomass was carried under the "solar umbrella" with the attendant "research" thrust, rather than a "market" thrust. Furthermore, the non-biomass energy sources under the solar umbrella (solar, wind, hydro, geothermal, ocean thermal, etc.) all had the connotation of being "free" energy sources if one could efficiently tap into them.

Biomass, on the other hand, has a supply/demand infrastructure that was not "free." Biomass, whether from agricultural or forest sources, has to be collected, transported, and processed as a feedstock or fuel. It has to be bought and sold as a secure feedstock/fuel commodity different from the other solar technologies.

It was with Congressional wisdom that alcohol fuels were legislatively removed from the solar umbrella in the late 70's, although the program was ineffectively divided between DOE and USDA. Other biomass elements, such as wood energy, were not legislatively broken out, and remain yet under the solar umbrella where the supply/demand commodity infrastructure is still not fully appreciated.

Another difference between biomass and other renewable technologies is that biomass is more market limited than technology limited. The technologies are well proven for biomass production of steam, electricity, and alcohol fuel energy forms. However, the financial community has been quite cautious in accepting the market for these biomass-derived energy forms—even though the technology is well established and there is already far more energy developed annually from biomass than for all nuclear power generation in the United States.

Let us compare the market development of the two most prevalent biomass energy forms: wood as an energy fuel, and grain as an energy feedstock.

First, the wood energy example. Although there are over 3,000 wood-fired combustors in commerical/industrial/utility operation in the United States, the market for wood energy projects outside the forest product industry is only now starting to be accepted by the financial community for debt and equity financing.

Two pieces of legislative assistance have helped the wood energy market to begin getting off the ground. The Public Utility Regulatory Policies Act (PURPA) and the Energy Tax Credits (ETC) were the necessary and sufficient legislative ingredients. PURPA opened the door to the key market segment because of long-term contracts for an end-energy component (electricity) that had a known market value and was increasingly being recognized as needed by forward-thinking utilities and commissions. The Energy Tax Credit, on the other hand, allowed for the necessary financial margin that made a project financeable.

The wood energy market was slow to get off the ground, however, because while the ETC has been present since 1978, PURPA had been under a legal cloud until this past year. Now that the Supreme Court has removed PURPA's legal cloud, the ETC's are scheduled to end in 1985. Both pieces of legislative assistance were supposed to happen in paralled; and for this past year, while they have effectively worked together, we have seen and participated in considerable positive activity. However, for the responsible growth of the wood energy power and cogeneration market, both PURPA and ETC's would be needed for a 5-year period of common application; and the recent Congressional refusal to extend the ETC's for 3 years will have a significant dampening on the growth of wood energy.

For the alcohol fuel example, three pieces of legislative assistance have been most important for project development. These are the loan guarantees, the federal and state excise tax exemptions, and the biomass ETC. At this stage, the financial community will still not finance an ethanol project without a federal loan guarantee; and this condition will probably remain the same with the recent federal excise tax exemption increase from 5 cents/gallon to 6 cents/gallon counterbalanced by the loss of the ECT next year.

Where are the biomass markets? The primary markets will currently be determined by what the financial community has the most experience in financing, namely wood-fired electricity and grain ethanol. All projects we know of, however, are very tightly near the margin; and only the most stable companies will be able to bring significant projects on-line.

Is biomas important for this country's energy needs? Definitely yes! Wood energy power generation is critically important for replacing oil- and gas-fired base-load in the near term and for offsetting the absence of any new nuclear plants in the longer term. Alcohol fuels remain a critically important component for potential near-term oil supply cutoffs and shortages, as well as for longer-term U.S. oil depletions. The prospects for ethanol will be further enhanced by the expected lead phase-down regulations an/or legislation and the continued search for a stable agricultural production policy.

Geographically, the biomass markets will be where there are adequate feedstocks (grains or weed) and an energy component needed (electricity or transportation fuel/octane enhancer). This actually means biomass markets almost everywhere in the United States, with particular emphasis on the power production and ethanol production facilities in Rural America.

WHY IS ULTRASYSTEMS IN THE MARKET

Fifteen years ago when Ultrasystems was incorporated, we often found ourselves in the position of taking the "crumbs" off the table left by larger engineering and construction firms, going after smaller projects that big companies were either unwilling or unable to undertake effectively. As a result, we developed a strong corporate capability in the design and construction of small- to medium-scale facilities in which we consistently emphasized a "systems engineering" approach.

We had experience in the development of conventional fossil energy facilities during the early 1970's, and with the advent of the oil supply disruptions of the last decade, we began to focus our capabilities on what we anticipatied as a growing national energy priority—the building of an alternative and renewable energy sector, including small-scale, efficient steam and power production and increased on indigenous renewable sources of energy.

We found that the small scale that characterizes alternate energy facilities (10,000–250,000 pounds/hour steam; 5–25 Mw power; 1–20 million gallons/year ethanol) fitted well with our corporate capabilities and experience. Between 1979 and 1981, Ultrasystems developed some 40 proposals to industry for the design and construction of such projects. The lessons of the oil supply disruptions seemed clear to us, and the enactment of federal energy legislation in 1978 evidenced that alternate energy was a national energy policy priority. It was thus disappointing to find that although our proposals were well received, most of them were not moving forward due to a host of reasons including shortage of industrial capital, the recession, high interest rates, skepticism about the effectiveness of then current federal energy legislation, and concern about Administrative energy policy. The alternative energy market was there, but little was happening to supply it.

Ultrasystems recognized the need to obtain an in-house financial capability to leverage and promote the development of alternate energy projects, and in 1981 we made a corporate public offering to obtain additional capital for increased construction bonding limits and to take equity positions in our own projects. We were thus enabled to undertake engineering and constrution projects for large and innovative industrial energy users such as Procter and Gamble who recognize the potential of renewable energy sources. Our public offering also enabled us to start our own subsidiary companies—Ultrapower, dedicated to the design, construction ownership, and operation of small-scale renewable energy electric power facilities. Ultrasweet, dedicated to the development and operation of a geothermal energy, corn-to-fructose project; and Ultrafuels, dedicated to the development and operation of projects producing transportation fuels such as ethanol.

We were certainly pleased to find our original public offering as well as a secondary public offering last year received so well in investment community. It bears testimony to Wall Street's faith in Ultrasystems as a company, as well the potential of alternate and renewable energy. We, of course, believe that alternate energy has a vital long-term role to play in providing for our nation's economic future.

However, the road has not been easy. In developing our expanding alternate energy business over the past several years, Ultrasystems, along with others, have experienced a formidable array of institutional obstacles, both governmental as well as marketplace.

In general, the governmental obstacles have involved regulatory rulings and delays from agencies such as the Federal Energy Regulatory Commission at the national ievel; Public Utility Commissions at the state level; and Water Control Districts at the local level. There has been various legal challenges to legislation already in place such as the PURPA and state ethanol excise tax exemption court cases and delays in federal legislation that would resolve the questions of extended tax credits and energy leasing provisions while the present 1985 sunset is approaching. There has been no consistent nor articulated Administration policy that encourages alterante energy development dspite the quite-predictable Middle East oil tensions.

The marketplace barriers have been no less intense. The financial community's "due diligence" on each energy project is affected by the same issues outlined above, as well as expected issues of feedstock availability and revenue stream contracts. The latter issues appear a matter of increased education and experience for the financial community. However, even such questions as feedstock availability are affected by USDA policy for wood or grains; and revenue streams depend critically on the stability of a given steam customer, the impact on the local utility of a nuclear plant startup, or the rate of lead phase-down replacement by ethanol.

A company such as Ultrasystems is an implementer of alternate energy projects. We don't make or significantly influence policy decisions at federal, state, or local levels. We do participate in utility commission rate discussions; work on boards of trade associations such as the Renewable Fuels Association, National Wood Energy Association, or Independent Electrical Producers Association; provide Congressional testimony where appropriate; and write our congressmen when appropriate.

Ultrasystems' bread and butter is in implementing projects, which calls for a high degree of creativity and flexibility, particularly when projects are being financed primarily with private funds and are being completed on 2-year cycles. When Ultrasystems develops any renewable energy project for itself or for clients, there are six major parameters which have to be satisfied in sequence. These are site, feedstock, revenue stream, engineering, environmental permitting, and financing. The satisfaction of any given parameter depends on the development of all preceding parameters. As a private company, Ultrasystems can effectively "control" only the siting and engineering parameters; but the feedstock, revenue stream, environmental, and financing parameters can be quite political and governed by forces beyond Ultrasystems' control or responsibility.

Despite these uncertainties and uncontrollable parameters, Ultrasystems has made a major corporate commitment to the overall alternate energy industry. We clearly have entered the market with our eyes wide open. Although the "glamour" of alternate or renewable energy has been tarnished, we still believe the market is important for the country's future and that there are financial opportunities available.

Ultrasystems likes to work where a touch of altruism can be rewarded with a fair financial return. That's why the company's future is tied to the economic, energy, environment, and defense improvements of our national life.

Companies getting into the alternate energy industry must be there for the long term. It is still a new industry being developed, and it needs responsible players on both the supply and demand side—farmers, entrepreneurs, small/medium/large-size companies. As with any new industry, the key word is responsible players, and Ultrasystems has committed itself responsibly to the industry.

WHAT IS NEEDED

Anyone in the alternate energy industry knows it has not yet fully arrived. There are both private and public actions and policies that affect the growth of the industry. This is on the part of government, financial institutions, and the industry participants themselves. Following is a list of general actions and conditions which we believe would lead to greater stability in the developing alternative energy industry, and particularly in the ethanol fuels industry.

First, a clear national policy needs to be stated. Because there are already a mixture of Economic support elements for the ethanol industry, the Administration and Congress need to define an overall energy policy with a clear recognition and integration of alternate energy in general, and ethanol in particular. That policy must then be consistent over time; balanced in relation to economic incentives for other energy forms; and articulated in clear language.

Second, there needs to be continued cooperation between agribusiness and the oil companies on the growth of the ethanol market. This is the first time in history that such cooperation has been shown for transportation fuels, and it needs to be complimented and fostered further. At the same time, the growing ethanol industry should not be "dominated" by either big oil or agribusinesses. It still has grass roots, and a responsible complement of farmers and small/medium-size businesses will be needed for a healthy growth.

Third, there needs to be continued education that the current oil glut is not a true condition of the future and that the alternative energy industry development should be encouraged to take place now while the country is neither in a panic mode nor an acrimonious mood such as might happen if the Middle East really blows up. Further, the ethanol industry must sell itself beyond the old patriotic "gasohol" image to be seen as the truly renewable fuel that results in environmental benefits, jobs creation, agricultural market stability, positive balance of payments, and oil backouts.

Fourth, there are a number of specific government actions that must be put in place and maintained for the continuity the evolving industry needs. The 1992 expiration date for the ethanol excise tax exemptions must be maintained. The excise tax exemption should be raised high enough (8–9¢/gallon) to allow the "debalkanization" of state tax exemptions for a more-orderly national industry development. Continued protection against foreign ethanol "dumping" is still needed. Stronger regulations or legislation on lead phase-down need to be acted upon as soon as possible. A clear statement of policy on the Farmer's Home Loan Guarantee program beyond FY 1984 is needed. A continuation of the Energy Tax Credit beyond 1985 needs to be enacted for continuity and recognition of the several-year development cycle for such plants.

Additionally, the Treasury Department needs to take another look at what are called "tax revenue losses" from such current assistance as the Energy Tax Credit. For example, Ultrasystems has performed an analysis of its first Ultrapower project, an 11 Mw wood-fired power plant, which showed that for just the 2-year construction period when the Energy Tax Credits are received, each $1 in Energy Tax Credits are counterbalanced by $3 in direct new tax revenues from the project. For a $1.56 million tax credit on the capital construction costs, approximately $2.5 million in new federal tax revenues and $2.1 million in new state and local tax revenues are realized. Beyond that, there are obviously continuing tax revenues without tax credits for the 30-year lifetime of the plant.

Fifth, continued research and development on fuel production technology is needed through both government and private means for ethanol markets 5–10 years downstream. As an example, Ultrasystems is working on a cellulose-to-diesel process under contract with DOE and Arizona State University and on a cellulose-to-ethanol process with the New Zealand government using private funds.

The primary purpose behind all these needed actions is to give the financial community an increased confidence in the future of alternate energy in general and ethanol in particular.

HOW IS IT WORKING

The growth of the alcohol fuel industry and related markets over the past 5 years has been positive, dramatic, and heartening. A broad range of particpants has been included in that growth including farm groups, entrepreneurs, small/medium/large businesses, and the financial community. Although by no means a mature industry, the seeds of responsible growth are clearly planted.

Ultrasystems has had experience over the past 5 years with many of the current financial and industry players in the alcohol fuel business. All of this activity has been in an engineering and project development role on behalf of others. In the past 2 years, however, Ultrasystems has developed the confidence to enter the alcohol fuel marketplace as a full participant in the design, engineering, construction, ownership, and operation of an ethanol refinery under a wholly-owned subsidiary, Ultrafuels. Our first project is the Dawn Enterprises project inWalhalla, North Dakota, with Dawn Enterprises as our Joint Venture Partner.

The project is financed by a combination of equity capital from Ultrafuels, Dawn Enterprises, and a limited partnership being placed by Shearson American Express with debt by the Bank of America and Bank of North Dakota. An Urban Development Action Grant loan is involved for some of the city utility infrastructures, as well as a $20 M Farmer's Home Loan Guarantee.

The project is presently under construction as seen from the photographs with a planned completion date of August 1985. The project will produce 11.3 million gallons per year of fuel-grade ethanol from approximately 6 million bushels of locally-grown barley, also yielding 69,000 tons annually of distillers dried grains and solubles. The energy source for the plant will be 42,000 tons of lignite coal annually.

The project will employ 57 full-time personnel for its 20-year projected lifetime, yielding an annual $1.5 M in wages. During the 2-year construction period, there are a peak 200 construction wokers and $4 M in construction wages. The project will cost $32.6 M to construct.

The Dawn Enterprises project has a number of other features worth noting. It will be the world's largest barley-to-ethanol facility with its traditional lowest starch basis feedstock cost. It is capable of alternate feestocks such as corn. The operating costs are relatively low with economical coal-fired steam; low electric utility cost; high energy efficiency; greater than 40 percent process steam recovery and reuse; economical yeast reuse provisions; and essentially zero discharge for process wastes.

All environmental levels are well below standards for air quality; and there are no community problems with traffic, aesthetics, water, waste treatment, or ash disposal.

Mr. Leon Dubourt, President of Dawn Enterprises, will further discuss the local and state impact of the project following my presentation.

The formal groundbreaking for the project is scheduled for Friday, July 20, 1984, at Walhalla, North Dakota, with a number of key dignitaries present. Governor Olson, Senator Burdick, Senator Andrews, and representatives from the Reagan Administration will be present. On behalf of Ultrasystems and Dawn Enterprises, we would like to invite all those in attendance at this hearing to the groundbreaking.

Mr. DORGAN. Thank you, very much, Mr. Kennel. Let me just say that Congressman Andy Jacobs from the great State of Indiana, is here with us this morning, has just arrived.

Congressman Jacobs is the chairman of another subcommittee of the House Ways and Means Committee and has served in Congress for many years with great distinction.

Andy, welcome.

Continuing with the first panel of witnesses, then, we will call on Leon Dubourt who represents Dawn Enterprises, from Walhalla, ND.

Leon.

STATEMENT OF LEON F. DUBOURT, PRESIDENT, DAWN ENTERPRISES, INC., WALHALLA, ND

Mr. DUBOURT. Congressmen Dorgan, Daschle, Jacobs. My name is Leon Dubourt. I am president of Dawn Enterprises at Walhalla, ND.

Dawn Enterprises is a North Dakota limited partnership the general partner and is a joint venture of Dawn Enterprises, Inc., a North Dakota subchapter S corporation, and Ultrafuels, Inc., a subsidiary of Ultrasystems, Inc., of Irvine, CA.

The partnership is constructing and will operate an 11.3 million-gallon-per-year denatured fuel ethanol refinery in Walhalla, ND.

The refinery will use annually about 5.5 to 6 million bushels of North Dakota grown feed barley as feedstock and produce anhydrous ethanol, approximately 67,000 to 69,000 tons of distillers dried grains with solubles and nearly 30,000 tons of carbon dioxide.

Fuel ethanol is an important fuel extender when blended at the 10-percent level with gasoline. More significantly, it is a valuable environmentally benign octane enhancer used to replace lead compounds in unleaded gasoline. Distiller dried grains is a source of 28 percent protein used to supplement animal feeds to increase weight gains in beef cattle and milk production in dairy herds.

Gaseous carbon dioxide may be captured from the fermentation process. Carbon dioxide is principally used in the carbonation of beverages, freezing of foods and in industrial applications, such as tertiary crude oil recovery. Recent research has found carbon dioxide to be an acceptable alternative to EDB or ethylene dibromide as a grain fumigant.

The plant will use approximately 45,000 to 50,000 tons of lignite coal from a mine located at Velva, ND. The plant will cost, which we have an artist's rendition of the plant on the pedestal, the plant will cost $32.6 million, including ancillary city facilities made possible by a Housing and Urban Development action grant or UDAG action grant of $4.6 million.

Construction employment will peak at 160 to 180 workers, with about $4.2 million in construction wages.

Presently 78 percent of these workers are drawn from the local area. Several small local contractors are participating as subcontractors to the primary contractor. Completion is scheduled for August 1985, with startup and testing in the fall. Full operational status will be achieved by late 1985 or early 1986. The plant will employ 57 to 60 full-time personnel, with an annual payroll of about $1.5 million, plus 120 to 130 people indirectly in transportation and service fields.

Prior to defining the current scope of the project, Dawn Enterprises, Inc., applied to the Department of Energy for a grant under provisions of the Energy Security Act of 1980, to study the feasibility of establishing a 50-million-gallon-per-year ethanol plant in northeastern North Dakota. Upon award of the grant, a year-long study was undertaken and when completed, it was accepted by the Department of Energy in late 1981.

The study confirmed both the economic and technical feasibility for such a processing facility. Subsequent to the completion of the study, significant changes occurred which lead us to reevaluate and perform extensive analyses of the fuel ethanol markets, financing alternatives, and feedstock supply and byproduct marketing.

In mid-1982, Dawn Enterprises, Inc., entered into an agreement with Ultrasystems Engineers & Constructors, Inc., to prepare an application for loan guarantee to the Farmers Home Administration.

The application consisted of a project plan for development, economic analysis and market data, financial projections and preliminary technical design for a 10-million-gallon-per-year anhydrous ethanol refinery using barley as a feedstock. A conditional commitment for a $20 million loan guarantee was issued in late 1982 by the Farmers Home Administration to Bank of America, our lead bank.

The FMHA loan guarantee was a key element in the task of assimilating the components of the financial package. The creation of major incentives in the form of increased investment and energy tax credits, accelerated depreciation, and exemptions of Federal and State gasoline excise and sales taxes served to allay investor uncertainty.

These incentives are reflected in our financial projections and enabled the joint venture and our investment banker, Shearson/Lehman American Express, Inc., to raise more than $17 million in equity, thus attaining a capitalization in excess of 40 percent of the total project costs.

This strong equity to debt position assures project success and is critical to the preservation of the investor confidence and expectations. It is apparent that without the political support represented by these legislative stimulants, such rural oriented and instigated enterprises would not become a reality.

We are part of an emerging industry which utilizes surplus agricultural production to add value and provide an environmentally acceptable alternative fuel in response to established national goals. The expansion of the excise tax exemption, in particular, would broaden and stabilize our markets for the primary product of the plant.

Gentlemen, this concludes my statement. I want to thank the committee for the opportunity to appear at this hearing, and I would also like to take the opportunity to invite each member of the committee and staff, and other folks attending the hearing, to the groundbreaking for the project on July 20, in Walhalla, ND.

[The prepared statement follows:]

STATEMENT OF LEON F. DUBOURT, PRESIDENT, DAWN ENTERPRISES, INC., WALHALLA, ND

Dawn Enterprises, is a North Dakota Limited Partnership. The general partner is a joint venture of Dawn Enterprises, Inc., a North Dakota Sub-Chapter "S" Corporation and Ultrafuels, a subsidiary of Ultrasystems, Inc., of Irvine, California.

The partnership is constructing and will operate a 11.3 million gallon per year denatured fuel ethanol refinery in Walhalla, North Dakota.

The refinery will use annually about 5.5 to 6 million bushels of North Dakota grown feed barley as the feedstock and produce anhydrous ethanol, approximately 67 to 69 thousand tons of distillers dried grains with solubles and nearly 30 thousand tons of carbon dioxide.

Fuel ethanol is an important fuel extender when blended at the 10 percent level with gasoline, more significantly, it is a valuable environmentally benign octane enhancer used to replace lead compounds in unleaded gasoline.

Distillers dried grains are a source of 28 percent protein used to supplement animal feeds to increase weight gains in beef cattle and milk production in dairy herds.

Gaseous carbon dioxide may be captured from the fermentation process. Carbon dioxide is principally used in the carbonation of beverages, freezing of foods, and in industrial applications such as tertiary crude oil recovery. Recent research has found carbon dioxide to be an acceptable alternative to EDB as a grain fumigant.

The plant will use approximately 45 to 50 thousand tons of lignite coal from a mine located at Velva, North Dakota. The refinery will consume a maximum of 62 thousand Btu's per gallon of ethanol produced as compared with the energy content of a gallon of ethanol of approximately 78 thousand Btu's, therefore achieving a positive energy balance.

The plant will cost 32.6 million dollars, including ancillary city facilities made possible by a Housing and Urban Development "UDAG Grant" of 4.6 million dollars.

Construction employment will peak at 160 to 180 workers, presently 78 percent of these workers are drawn from the local area. Several small contractors are participating as sub-contractors to the primary contractor. Completion is scheduled for August, 1985, with start up and testing to follow, full operational status will be achieved by late 1985 or early 1986. The plant will employ 57 to 60 full time personnel, plus 120 to 130 indirectly in the transportation and service fields.

Prior to defining the current scope of the project, Dawn Enterprises, Inc., applied to the Department of Energy for a grant, under provisions of The Energy Security Act of 1980, to study the feasibility of establishing a 50 million gallon per year fuel ethanol plant in Northeastern North Dakota. Upon award of the grant, a year-long study was undertaken and when completed it was accepted by the Department of Energy in late 1981. The study confirmed both the economic and technical feasibility for such a processing facility. Subsequent to the completion of the study, significant changes occurred which led us to re-evaluate and perform extensive analysis of fuel ethanol markets, financing alternatives, feedstock supply and by-product marketing.

In mid 1982, Dawn Enterprises, Inc., entered into an agreement with Ultrasystems Engineers and Constructors, Inc., to prepare an application for loan guarantee to the Farmers Home Administration.

The application consisted of a project plan for development, economic analysis, market data, financial projections and preliminary technical design for a 10 million gallon per year anhydrous ethanol refinery using barley as the feedstock. A conditional commitment for a $20 million loan guarantee was issued in late 1982 by the Farmers Home Administration.

The loan guarantee was a key element in the task of assimilating the components of the financial package. The creation of major incentives in the form of increased investment and energy tax credits, accelerated depreciation, and exemptions of federal and state gasoline excise and sales taxes served to allay investor uncertainty. These incentives are reflected in our financial projections and enabled the joint venture and our investment banker, Shearson/Lehman American Express, Inc., to raise more than $17 million in equity, thus attaining a capitalization in excess of 40 percent of total project costs. This strong debt to equity position assures project success and is critical to the preservation of investor confidence and expectations. It is apparent that without the political support represented by these legislative stimulants such rural oriented and instigated enterprise would not become a reality.

We are part of an emerging industry which utilizes surplus agricultural production to add value and provide an environmentally acceptable alternative fuel in response to established national goals. The expansion of the excise tax exemption, in particular, would broaden and stabilize our markets for the primary product of the plant.

DAWN ENTERPRISES—PROJECT DESCRIPTION

Project: 11. million gallons per year anhydrous ethanol.
Site: Rural Walhalla, North Dakota.
Zoning: Industrial/Agribusiness.
Cost: $32.6 million.
Completion: Construction phase 3rd quarter 1985; operational 4th quarter.

Economic benefits

Construction employment: 160–180 workers at peak construction, $4.2 million in construction wages.

Facility operation: 20 year expected plant life, 24 hrs/day, 330 days/year, 57-60 full-time employees, $1.5 million annual employee wages.

Annual procurement: 5.5-6 million bushels feed barley, 45-50,000 tons North Dakota lignite coal, enzymes, yeast, chemicals.

Annual production: 11.3 million gallons fuel grade denatured ethanol, 67-69,000 tons distillers dried grains and solubles, 30,000 tons carbon dioxide.

General environment

Traffic: Rail and truck, deliveries Monday through Friday.

Asthetics: Rural site—one mile SE of Walhalla, on site storage for raw materials and finished products.

Water: Off site wells provide all plant needs, reverse osmosis treatment.

Waste treatment: On site treatment and recycle to process.

Air quality: Design meets or exceeds all EPA requirements for limits on dust, volatiles or nitrogen oxides; ash disposal to off site land fill.

Process highlights

World's largest barley-to-ethanol refinery.

Traditionally lowest cost starch-base feedstock.

Capable of utilizing alternate feedstock such as distressed grain or corn.

Economical steam cost from lignite fueled boiler.

Low electric utility cost; served by Nodak REA through Minnkota and Otter Tail distribution systems.

In excess of 40 percent of process steam energy is recovered and reused.

Energy efficient, maximum energy consumed 62,000 Btu/gallon of ethanol produced; energy value per gallon of ethanol 78,000 Btu.

Economical reuse of yeast.

Nearly zero discharge of process wastes.

Mr. DORGAN. Leon, thank you very much for the testimony.

Next, we would like to call on Ed Wilkinson, representing Agri-Energy from Crookston, MN. Mr. Wilkinson.

STATEMENT OF EDWARD J. WILKINSON, CHAIRMAN OF THE BOARD, NATIONAL ALTERNATIVE ENERGY ASSOCIATION, MINNEAPOLIS, MN, AND PRESIDENT, AGRI-ENERGY, INC., CROOKSTON, MN

Mr. WILKINSON. Thank you, Mr. Chairman. I appreciate this opportunity to speak to your committee this morning.

I'm Ed Wilkinson, chairman of the board of the National Alternative Energy Association of Minneapolis, and president of Agri-Energy of Crookston, MN.

Agri-Energy is in the process of developing a network of four 10-million-gallon plants on a joint venture basis, and one 5-million-gallon plant in Minnesota and North Dakota.

I have made proposals directly to several prime banks, CitiCorp, Crocker in San Francisco; First National Bank & Mercantile in Dallas, Tex.; First Bank System, Norwest & F&M Marquette, in Minneapolis; E.F. Hutton in Atlanta and New York; A.G. Becker in New York; Drexel Lambert, Credit Souiss in New York, Paine Webber, Minneapolis, Chubb in San Francisco, in the big eight CPA firms of Touch Ross, Ernst & Whinney, and Coopers & Lybrand.

I've made several proposals to smaller investment bankers and securities houses attempting to assemble equity and debt funds for ethanol projects around the country. And the main questions that are always asked is: What is the Government going to do? Is the energy credit going to be renewed? Is the Federal excise tax exemption going to be rescinded?

We never know from one session of Congress to the next what program or incentive is in danger of being eliminated by the legislative branch, the executive branch, or by a compromise of both.

And Agri-Energy, specifically, has been the victim of a $4.3 million loss with our equity in an escrow account when the current administration changed their policy midstream.

So we have firsthand experience of these changes in policies.

We need a comprehensive program of loan guarantees, energy credits and Federal excise tax exemptions to provide a base that is understandable to the finance community, and that's fixed. The key issue is that it's fixed in some way.

The energy credit alone on a 10-million-gallon plant means $2 million in return on equity to investors that put $8 million of equity at risk. It only takes 7 years of taxing a $28 million project at 1 percent to get back that $2 million. Given an energy credit in front and if necessary tax the plant after it is running, but provide the incentive in the front end program.

CPA firms and lawyers will not advise an investor that comes to them for advice on the likelihood of an energy credit being available 18 months later when the construction is complete, when that investor intends to use that credit on his tax return.

And why not? Because neither the lawyer nor the CPA can assure the investor that Congress won't change the law. We must stop in some way this indecision and put a program into law that will not change and fix it through 1992 at a minimum.

The 6 cents exemption for Federal excise tax, which is currently established, and goes through a process of escalating is fine, but at some point, it needs to be fixed. If it's 6 cents or larger, or whatever it is, it needs to be fixed and stop changing. The changing creates an atmosphere where someone is always looking for a better incentive, so it needs to be fixed, even if it's only 6 cents.

Equity investors of most ethanol projects put 20 or 25 percent of the total project cost at risk as equity. And they have no assurance whatsoever that this equity or the return on their equity will be returned.

The projections, therefore, indicate that the tax incentive must be firmly committed in a program that is law and not subject to constant division and revision. The destruction of the current foundation of alternative energy supply and octane booster and thousands of farmers only current domestic market is sometimes at risk through our great democratic process of compromise. We're constantly changing programs and the fact that this ethanol program should not be stalled by trading it for some manufactured product or stopped because of foreign diplomatic reasons, the ethanol incentive program should be consistent and not experiencing a constant change.

The ethanol industry is the most attractive, nonpolluting, multibeneficial new industry that's currently before our economy in 1984. I don't want to ramble on this subject because it's very easy.

I do want to say that investors will not invest without the energy credit; the buyers of the ethanol will not buy without relief on the excise tax, and the industry will stall without banks loaning money to these projects, and they won't loan the money without some sort of extra collateral from larger companies or loan guarantees.

And ethanol incentives, as I have discussed them, are not a cost program; they are a positive benefit to the U.S. economy. The GAO report that's just been finished on the impact of incentives for ethanol basically agrees that the incentives are cost-effective and do not have a negative draw on the budget balancing in process. Senior officers at the Treasury Department agree with the extension of the energy credit.

I hear people complain about the cost of the ethanol programs that are just not true. I've enclosed a report done by Battelle Memorial Institute in 1980, that states the incentives used to stimulate all other energy production for the Department of Energy was $252 billion through 1978. Nuclear received $21 billion; hydro $16 billion; coal $11 billion; oil $123 billion; gas $14 billion and electric $64 billion. This is not the time to shorten our ethanol incentives but a time to install a fixed, comprehensive program with items that I've stated, through December 1992.

The economy needs the jobs; the environment needs the lead removed; the farmers needs the market for their grain; and the country needs a reduction in our imports of oil. Taxes generated by this new industry will help the Treasury.

I will close with a cost/benefit model that I think will be of extreme interest to you.

In 1985, the current lead phasedown law will require the replacement of 2.3 billion gallons of ethanol equivalent as octane booster. If you assume that ethanol would get only 20 percent of that market, just one of the five suppliers, just get 20 percent of that market, that would be a new additional production of 476 million gallons a year.

At a $3 per capital cost per gallon, that's $1.4 billion in new capital assets; 75 percent of that value approximately is eligible for energy credits or $1,071 million.

A 10-percent energy credit on that comes to about $107 million. The Federal excise tax exemption currently at 6 cents would be another $285 million for a total program cost of $392 million.

Let's look at the benefits of a $476 million new industry in place. It would be $1.4 billion taxable at 2 percent, in any community, it's $28 million a year; 38,000 new jobs, and 1 new job is created every 12,000 gallons of production. At $20,000, that's a new payroll of $760 million to be taxed.

That's a $1.1 billion increase in our gross national product; the reduction of $470 million in just straightline no multipliers on our reduction in trade balance. Its 198 million bushels of corn or starch equivalent grains that would be consumed; on an annual basis—and this is an every-year situation—these benefits would continually accure.

The payroll taxes, for instances, withheld by IRS just at a 20 percent level, would be $152 million. Social Security contributions would be $101 million; State income taxes would be approximately $23 million. And dealing with a freight savings on grain consumed at a local community versus being hauled in the North Dakota Minnesota Red River Valley area of freight to the various ports, the minimal freight is 60 cents a bushel. If we only reduced the freight by 10 cents a bushel, it would be a $19 million savings per year.

And the storage costs for 1 year on grain that would not be stored but consumed in a process industry would come to $71 million.

This is the net benefit overall annual benefit of $394 million against the $392 million or at least a positive flow over this particular industry development. It's not a cost program.

With these potential benefits before us, let's just all join together in an industry, in a legislative, in an engineering, cooperative effort. The most important issue is forming a policy that the finance community will accept and recognize as this is the program and it's not subject to change.

Thank you, Mr. Chairman, for the opportunity to speak to these issues this morning.

[The prepared statement follows:]

STATEMENT OF EDWARD J. WILKINSON, CHAIRMAN OF THE BOARD, NATIONAL ALTERNATIVE ENERGY ASSOCIATION AND PRESIDENT, AGRI-ENERGY INC.

Mr. Chairman, and members of the subcommittee, I appreciate this opportunity to present my views on this important subject this morning. I am Edward J. Wilkinson, Chairman of the Board of the National Alternative Energy Association, Minneapolis, MN, and President of Agri-Energy, Inc. of Crookston, MN.

We are in the process of developing a network of four 10,000,000 gallon plants and one 5,500,000 gallon plant in Minnesota and North Dakota.

I will begin my remarks with just a reminder of what the ethanol industry has accomplished in five short years, 1978-1983.

1983 SUMMARY—ETHANOL IS NOW PERFORMING FOR AMERICA

Ethanol is a growing industry—10,000,000 gallons in 1978—400,000,000 gallons in 1983.

An expanding new market for farmers grain—150,000,000 bushels of corn in 1983.

A renewable domestic fuel source.

Creating new employment—directly and indirectly—1 job is created for every 12,000 gallons of production.

400,000,000 gallons=33,000 new jobs in 1983.

Increasing the gross national product—$1,090,000,000 in 1983.

Reducing dependency on foreign oil—8,930,000 barrels in 1983.

Balance of trade reduction—ethanol $258,000,000, feed $150,000,000 in 1983 for a total of $408,000,000.

Improving the environment—reducing lead poison.

I have made proposals to or with clients to:

Citicorp—San Francisco, CA; Crocker National Corp.—San Francisco, CA; 1st National Bank—Dallas, TX; Mercantile Texas System—Dallas, TX; First Bank System—Minneapolis, MN; Norwest Corp.—Minneapolis, MN; F&M Marquette—Minneapolis, MN; E. F. Hutton—Atlanta, GA; A. G. Becker—New York, NY; Paine Webber—Minneapolis, MN; Chubb Group—San Francisco, CA; Miller & Schroeder—Minneapolis, MN; Toiuche Ross—San Francisco, CA; Ernst & Whinney—Milwaukee, WI; and Coopers & Lybrand—Minneapolis, MN.

I have also made proposals to several smaller investment bankers and securities houses attempting to assembly equity or debt funds for ethanol projects around the country. The main questions always asked are, "What is the government going to do?" "Is the Energy Credit going to be renewed?" "Is the federal excise tax exemption going to be rescinded?" We never know from one session of Congress to the next what program or incentive is in danger of being eliminated by the legislative branch or the executive branch, or by a compromise of both.

We need a comprehensive program of loan guarantees, energy credits and federal excise tax exemptions to provide a base that is understandable by the finance community in general to be fixed through 1992.

The Energy Credit along on a 10,000,000 gallon plant means $2,000,000 in return on equity to an investor that is putting $8,000,000 of equity at risk. It only takes 7 years taxing that $28,000,000 project at 1 percent to get the $2,000,000 back. Give the energy credit in front and tax the plant after it is running.

C.P.A. firms and lawyers will not advise an investor that comes to them for advise on the likelihood of the EITC being available 18 months later when a plants construction will be complete and the EITC can be used on the investors tax return. Why? Because neither the lawyer not the C.P.A. can assure the investor that Congress won't change the law. We must stop this indecision and put a program into law that will not change until 12-31-1992.

The 6 cents per gallon exemption of the federal excise tax should stay unchanged until 12-31-1992.

Equity investors in most ethanol projects are putting 20-25 percent of the total project cost at risk as equity with not assurance they will make the projected return. Therefore, the tax incentive must be firmly committed in a program that is law and not subject to complete destruction by a small group of uninvolved and/or uninformed conference committee members that trade the foundation of an alternative energy supply or octane booster and thousands of farmers only hope of a new domestic market for grain, for some other program in the democratic system of compromise.

This program should not be stalled by a trade for some other manufactured product or stopped because of foreign diplomatic reasons. The ethanol incentive program must be consistent.

It is the most attractive non-polluting multi-beneficial new industry to help our economy available in 1984.

I don't want to ramble about this subject. I do want to say the investors won't invest without the EITC. The buyers won't buy without the help of the 6 cents tax relief. The industry will stall without the banks loaning money to these projects and they won't make a loan without some extra collateral or guarantees.

Ethanol incentives as they are now are not a cost program but a positive benefit to the U.S. economy.

The G.A.O. Report on the impact of the incentives for ethanol, basically agrees that the incentives are cost effective and do not have a negative draw on the budget balancing. Senior officers at the Treasury Department agree with the extension of the EITC through 1990.

I hear people complain about the cost of the ethanol programs that are not true. A report I have enclosed done by Battelle Memorial Institute in 1980, states that the cost incentives used to stimulate all other energy production for the Department of Energy was $252,000,000,000.

This is not the time to shorten any of the ethanol incentives but a time to install a fixed comprehensive program with the items I have stated through 12-31-1992.

The economy needs the jobs, the environment needs lead removed, the farmer needs a market for his grain, the country needs to reduce our imports of oil. The taxes generated by this new industry will help the Treasury.

I will close with a cost-benefit model that I think needs your complete attention.

Let us all work together to double the current ethanol production.

Thank you, Mr. Chairman for the opportunity to express my views before your committee.

1985 COST/BENEFIT MODEL

1985 cost

The lead phasedown in 1985 will require the replacement of 2,380,000,000 gallons of ethanol equivalent as octane booster.

Assume 20 percent of this market to ethanol 476,000,000 gallon production.

At $3 per gallon capital cost equals $1,428,000,000.

At 75 percent eligible for EITC equals $1,071,000,000.

Time cost EITC	$107,100,000
Exempt Federal excise tax	285,600,000
Total cost	392,700,000

Benefits and life estimate

1. 476,000,000 gallons new ethanol production.
2. $1,428,000,000 capital cost of hard assets to taxed at 2 equals $28,000,000—every year.
3. $446,000,000 soft cost for capital formation and W/C—1 time.
4. 38,000 new jobs at (20,000) at $760,000,000 payroll—payroll every year.
5. $1,113,000,000 increase in gross national product—every year.
6. $394,000,000 reduction in balance of trade from oil—13,600,000 barrels—every year.

7. $176,000,000 sales of DDGS or gluten feed export equals 50 percent, of production—every year.
8. 198,000,000 bushels of corn or other grain consumed—every year.
9. $1,190,000,000 in new economic activity generated for our economy (within 100 mile circle of plants)—every year.
10. $152,000,000 payroll taxes paid to I.R.S. at 20 percent—every year.
11. $101,840,000 Social Security taxes paid to Government at 13.4 percent—every year.
12. 22,800,000 State income taxes paid at 3 percent—every year.
13. $19,000,000 freight saved on grain at 10 cents per bushel—every year.
14. $71,280,000 storage saved on grain at 36 cents per bushel—every year.
$394,920,000 annual benefits.

AN ESTIMATE OF THE COST INCENTIVES USED TO STIMULATE ENERGY PRODUCTION

[In billions of 1978 dollars] [1]

	Nuclear	Hydro	Coal	Oil	Gas	Electricity	Total	Percent of total incentive
Taxation		$2.00	$4.74	$55.48	$14.92	$38.83	$115.97	46.0
Disbursement				1.30			1.30	.5
Requirements	$1.7	.04	.80	57.49	80		59.23	23.5
Traditional services			2.57	6.92		.52	10.01	4.0
Nontraditional services	17.2		3.55	1.88	.30		22.93	9.1
Market activity	2.1	[2] 14.86	.02	.50	.15	25.12	42.90	17.0
Total	21.0	16.90	11.68	123.57	14.57	64.52	252.24	100.0
Percent of total incentives	8.3	6.7	4.5	49.0	5.8	25.6	100	

[1] Excerpted from "An Analysis of Federal Incentives Used to Stimulate Energy Production", prepared for the U.S. Department of Energy by Battelle Memorial Institute, February 1980.

[2] This value based on incentive definition 1 (Federal money outstanding). See respective chapters for a discussion of the alternative definition.

Mr. DORGAN. Mr. Wilkinson, thank you very much for your testimony.

Next we would call on Wayne Nelson who is president of Nelson Farming, Inc., in Winner, SD. Mr. Nelson.

STATEMENT OF WAYNE NELSON, PRESIDENT, NELSON FARMING, INC., WINNER, SD, AND PAST PRESIDENT OF THE NATIONAL ASSOCIATION OF WHEAT GROWERS

Mr. NELSON. Thank you, Mr. Chairman and members of the committee.

I'm representing myself as a wheat farmer from Winner, SD, and also as past president of the National Association of Wheat Growers. I'd like to share a couple of our ideas in wheat growers on alcohol fuels.

I'd like to look at it primarily from the market side the increased market. The wheat farmer now, as you all know, in the case of all grains or most grains, and especially in the case of wheat, we are in an excess stock situation right now, and we feel that if we could have some new markets, both domestically and overseas, that's going to greatly enhance our price capabilities in these incoming years, and certainly alcohol fuels would offer one new marketplace for wheat, as well as some of the other grains.

Also, in the case of wheat, we feel that it offers some byproducts that are more important than possibly some of the other starch substitutes used in making alcohol fuels. We are looking at the possibility of a plant in Winner, SD, producing vital glutant as a primary product, and also producing alcohol and also byproducts for feed usage.

And with the use of high protein wheat of 13 percent or better, it becomes very practical to produce the glutant for a food enhancer, not only in America, but also in some of the developing nations where they need much more protein than is available to them now, and also the alcohol and, of course the feed byproducts that are produced in any alcohol production process.

So we feel that it's very important to have this increased market responsibility and as Congressman Daschle has stated earlier, certainly our exports have been going down in the last 2 years. Maybe we can't make up all of the difference strictly in exports; we have to look domestically, and we're hopeful that through the alcohol fuels program, maybe we can see some increased market for wheat and other grains as well.

The recent conference for the new tax bill—we're very encouraged to see the increase to 6 cents for the exemption on the excise tax. We, as a policy of the National Wheat Growers, would like to see that at 9 cents, and we're working our way up to that and hopefully we'll have that in the future.

We're also very happy to see the continuation of the tax credit until 1992, and hopefully we can have that as a basis for even longer than 1992, and I think that will help to develop some new plants.

Certainly, now in looking at the new plants that we're looking at in Winner and in other parts of the State and the Nation, financing is the No. 1 problem. Something has to be done through some help in a guaranteed loan program or some increased tax incentives, or something, to get the program off the ground in many different parts of the country. I think that there won't be any problem at all in sustaining it, once it's off the ground.

I'd like to thank you people for the opportunity to come before your committee and I'd be happy to respond to any questions at the proper time.

Thank you.

Mr. Dorgan. Thank you very much, Mr. Nelson. And we appreciate the testimony of all of the members of the panel.

I'd like to just ask one or two questions and then call on Congressmen Daschle and Jacobs for any questions they might have.

Clayton, if I might address a question to you. I know hearing your testimony, and knowing the investment and time and energy that you've made in trying to develop the plant down there, how disappointing this must be—at least the experience you've had with the most recent investor.

Can I have you amplify a little on the reasons that were stated for the pullout of the investor, and how that connects to the tax system?

Mr. Litchfield. Well, one of the first reasons, there was about four or five reasons, Congressman, but one of the first and foremost reasons was the fact that the failure of Congress to extend the energy investment tax credit. And the financing, the way it was structured with Ashland, that was about a $7 million item, and it brought the return of below what they were willing to accept as far as going into a venture of that nature.

That was the No. 1. Second one is higher interest rates. Now we can set here and, in my personal opinion, what we're talking about this very day is the same reasoning why we have high interest rates, because we've got a large debt and everything else.

Well, you can't pay off a debt with borrowed money; you have to do it with earned income, and that's where this project comes in at earned income. And so that's how you bring down interest rates; that's the second reason, higher interest rates, at a time when we're going to be blowing the most amount of our dollars, that was the two main reasons why they elected at this time to shelve the project.

Mr. **Dorgan**. Congressman Daschle.

Mr. **Daschle**. I want to commend the panels for what I think were excellent statements across the board. Clayton, I think you could save some souls if you gave that speech on the road somewhere. You really did a tremendous job. [Applause.]

That really goes for all of you. Ed, I was extremely impressed with all of your facts. I have not yet seen, until today, the compilation that you've produced in your testimony of the kinds of costs that other industries have generated in production. Nuclear, $21 billion; hydroelectric, $16 billion; coal, $11 billion; oil, $123 billion in various Government costs; gas, $14 billion; electricity, $64 billion. A total of $252 billion; Dr. Dobbs had compiled the cost of alcohol and came up with $224 million, $225 million—that's one-thousandth of the cost that we've spent on all the other industries combined.

It seems to me that we're getting a pretty good deal.

What I'd like to ask you, all of you as a panel, if you could address it: No. 1, what would happen if we would federalize the entire cost of the tax exemption? What do you think the industry would look like by the year 1992 if we would give you the continuity that so many of you addressed, the full support behind the tax exemption that we'd have to have.

Second, how much additional help would it be to have the tax credit during that period of time? Describe for me what the alcohol fuel industry would look like by the year 1992?

Mr. **Wilkinson**. Well, one of the key issues that come up continually in the banking, one of the repeated questions that come up, and it's not just in the form of a question, it's a complete understanding of the program. When you first go into a meeting with a prime bank, and the first thing it tells you is understand that we are a prime bank; that we lend nothing less than prime rates and fully collateralized.

Which means we don't deal with a startup company. How are startup companies going to get a startup industry if we don't get some loans from somewhere? They need the backup confidence that the energy credit's going to be there; then you can develope the equity funding. If the credits are in place, you assemble your equity funds. You go to the bank, and you say, I have $8 million in equity in hand because the benefits are there strictly on the basis of a reasonable return on the risk capital which is the equity capital.

And then the investor will invest, but the bank will not lend if he doesn't have a secure loan; he wants to understand that his payment is going to be made; he doesn't understand anything else. He's not going to learn about the ethanol industry, and you go through a long process of bringing documents to him, from the Federal standpoint, from the State standpoint, from the agricultural side, from the energy side, from the lead phaseout side, and he is very very well informed if he had time to read all your documents.

But they don't have time to do that, and they want to know, through their type of analysis, they go to their book, they see if their ratios are correct on return on equity, on return on sales, return on assets, the projections are reasonable, they want a large CPA firm to certify that the conditions in your pro forma are correct, and when you meet the generally acceptable CPA and banking requirements for making a conventional loan, then they make their decision on making a loan or not, if it's just simply a standard good loan. There's so much indecision in this program of incentives that currently exists, they have no confidence whatsoever that we'll be alive when the due bill comes; 18 months after you make your commitment for a mortgage if the construction goes perfect, you've got an 18-month timeframe. I'm talking now basically on plants of 5–10-million gallons and up and if you get into the bigger plants, that 18 months may stretch into 20 months or 22 months—but you're basically dealing with almost 2 years off in advance and a banker needs to be convinced, the investment banking firm that raises the capital needs to be convinced that the energy credits are there.

That process, strictly an evaluation of the loan that they make and the equity investment, has to be fixed. The industry would develop, then, on the basis of whether it's 200 million, or 500 million, or 600 million gallons per year of production and, in response to your question about how much would be achieved by 1992, you would have a couple of billion-gallon industry for sure.

Mr. DASCHLE. A couple of billion?

Mr. WILKINSON. Yes sir.

Mr. DASCHLE. So, in other words, what you're saying is you would see at least a 400-percent growth over what the industry is today?

Mr. WILKINSON. That's correct, if things were fixed and could be understood and accepted as fixed, the investment community is very enthused with the information that you provide to them on an ethanol investment. And an ethanol loan. But they have no comfort whatsoever that it's going to be around when they need it.

Mr. DASCHLE. Very good. Thank you. Clayton.

Mr. LITCHFIELD. I'd like to add this and frankly you need to be cognizant of it and that is that we continue to—maybe it's just me—the thing you need to be cognizant of is that we're running headlong into this 1992 deadline. This is another reason why it's so frustrating for me is because you're running into some timeframes that you can't deal with.

In order to get any investor to look seriously at these projects, compared to the Government program that we now have, the project has to be up, and running, and paid for by the end of 1992. Now, in order for that to happen, it has to happen this year. It has to get under construction this year.

Or, in using his timeframe, as far as building, in order for that project to be up running and have the time to be paid for by the end of 1992.

So, even if all of these things come into play like you're saying, you're running dead ahead into that bottom line time constraint of 1992 because in all of our dealings with finance people, when you start talking about pushing that deadline past 1992, they don't want to talk to you.

Because, again, had you made the commitment, that's what the bottom line is, that when is our Government going to make the commitment and that's a deadline that we're running headlong into that we've found, and again, that's why it's so frustrating for us because of the time element involved to put something like this together.

I would venture to say that any projects that aren't underway in the next 18 to 24 months are pipedreams.

Mr. DASCHLE. Bob.

Mr. KENNEL. You asked about two parameters—the increase or the federalization of the excise-tax exemption, and restoring the energy-investment tax credit. I can answer not so much for the global issue; I can answer from the perspective of what we're doing.

The energy-investment tax credit is the financial margin against which not only the financial community says they'll finance, but it's the financial margin against which we say we will put our own money in as well. So if the EITC were extended, that would be a positive step from our perspective, such that on a continuing basis, we, as a company, might build 20 to 25 million gallons a year of capacity through 1992. While that is not going to shake the world, it's a responsible input.

On the question of federalizing the energy excise-tax exemption, I think what Dave Hallberg calls the debalkanization issue, it would be very important from our perspective, in that it would allow us to develop projects where there is either a compelling of market need for ethanol, or a compelling supply availability of feedstock, independent of which States would or would not have had State excise-tax exemption.

The other major parameter that the financial community always goes after is the weakest link they can find, even if it has nothing to do with the basic project. By keeping the current Federal excise-tax exemption and State excise-tax exemption situation, you've got two variables to deal with and they change from time to time.

Getting the States out of the picture with a single Federal excise-tax exemption would be the elimination of an unnecessary variable that would be very helpful in the eyes of the financial communities as well.

Mr. DASCHLE. Well, thank you all. You'd all agree, then, that both the federalization and the investment tax credit are crucial to continued growth within the industry. You're unanimous on that?

Mr. WILKINSON. That's right.

[All heads nodding.]

Mr. DASCHLE. Mr. Chairman, I can only add one thing and that is that I share the enthusiasm that you expressed earlier concerning Congressman Jacobs coming to South Dakota. This is the first time that I've had the opportunity to have Andy come to South Dakota; he's a personal friend and one that is highly regarded in Congress.

This is a very important date for us and we're just delighted he's here to share this time with us.

Mr. Dorgan. Thank you. Congressman Andy Jacobs.

Mr. Jacobs. I wonder if this microphone will work for me? Well, Tom is really my guru on this subject and he asked practically the question that I had in mind. I'd like to know if you have an opinion, and, if so, whether you'd share it for the record, about what will happen 16 years hence at the turn of the century, if the credit, as conceived at present, were maintained steadily through that period of time in terms of the percentage of alcohol motor fuel used by the U.S. Fleet.

Anybody have a guess at that? What percent of the American fleet motor fuel would be essentially alcohol based by then?

Mr. Wilkinson. I don't know which microphone's going to work here but—on the basis of current trends, by 1990, it's expected that the gasoline consumption would be down to somewhere around 85 billion gallons.

If we project still the 10 percent level, you'd be dealing with a 7- or 8-billion-gallon ethanol industry, and I think it's going to take an extremely aggressive construction industry and coordination of the finance communities to build 8 billion gallons by the year 2000.

Mr. Jacobs. Well, are you taking into account the possibility of scientific discovery and breakthrough in your own industry; the shortcuts that may develop along the line?

Mr. Wilkinson. Those technological benefits that are coming about through genetic engineering currently just intensify the efficiency of a production facility; the physical assets that you build really are not that involved in the change. The current technology changes involve more the process and biochemistry and the same vessels, pipes, pumps, and physical structures, will just become more efficient on the dollar invested.

The yield may increase by 10 percent, and then 15 percent, and then 30 percent, but your total capital asset won't change much. The plant is segmented into four basic areas; your grain handling is one section; fermentation and distillation, and then your byproduct handling. All of those won't change all at the same time or to the same degree, so——

Mr. Jacobs. Well, my point is, I suppose it's impossible to estimate with any precision how much production could be brought about by this incentive by the turn of the century, since you really don't know exactly what you're going to discover between now and then, in terms of making the process more efficient, do you?

Mr. Wilkinson. If we just zeroed in on a 10 percent level, I think the farm community would be tremendously improved, the physical health, the financial health of the farm community would be improved; the octane-booster market would be impacted, and each of those areas would be significantly impacted by a 10-percent level. I wouldn't personally be looking to exceed 10 percent.

Mr. Jacobs. Well, I can tell you that your industry has made Congressman Daschle a strange conversationalist for the last 6 months, no matter what you say to him, hello or—what time is it, he always comes back energy credits.

Mr. **Litchfield**. Well, Congressman, I'd like to say something. The more, the better. That's the point that I was trying to make—the more, the better. Because anytime we're doing business with ourselves—you know, you're buying from your father.

At least you're going to inherit it if nothing else. At least you're not giving it away to somebody else. And right now, we've got a policy in the agricultural field, and it needs to be pointed out.

Everybody looks at exports as being a panacea to what is going to help agriculture. Export for the sake of exporting? Why do we want to export our children's inheritance? That's really what we're doing it. We're exporting it at less than what it costs us to produce it. What is the purpose of selling something for less than what it costs you to produce it?

We may as well consume it ourselves, and then we've got the product, and we've got the industry. That's the point that I was trying to make.

So the more, the better, because this is the type of thing that has to be looked at in a broad spectrum, not just this committee or just another committee.

Mr. **Dorgan**. Clayton, do you have a copy of your testimony? I don't have it.

Mr. **Litchfield**. Yes, I do; I'm sorry. I have it right here.

Mr. **Dorgan**. Thank you very much. Let me say to this panel that I think the information you've given us is going to be extraordinarily valuable. Tom mentioned the graph that you gave us, Mr. Wilkinson.

This information that I think, when it becomes part of the permanent record here, is going to be a central source of very valuable information for all of us, and I appreciate all of the testimony that you've presented to date.

And with that, I thank you very much. The next panel, if you would come forward, is a panel that as the North Dakota Department of Agriculture Utilization Commission—executive director—Agriculture Products Utilization Commissioner Dean McIlroy.

Jerome Hickman, chairman of American Ag Movement in North Dakota.

South Dakota Farmers' Union, Leland Swenson, president.

American Automobile Association, the Highway Users Federation, and the South Dakota Auto Club, Mr. Durand Young.

And if you gentlemen would come forward and take the stand, I would appreciate it. And Mr. Tom Doyle will also be on this panel. Mr. Tom Doyle, county engineer for Nebraska, I believe.

Gentleman, again, let me reemphasize, if I might, that we would like you to summarize your testimony; we'll make your testimony a part of the record in its entirety but we would very much appreciate it if you would summarize your testimony in 5 minutes, for us, 5 minutes, that's about half as long as we've been experiencing. Good testimony, but nonetheless, we do ask, because of the number of people who want to testify, that you would summarize in 5 minutes and we'd appreciate that very much.

Mr. Dean McIlroy, executive director of Agricultural Products Utilization Commission. Mr. McIlroy.

STATEMENT OF DEAN L. McILROY, PH.D., DIRECTOR, NORTH DAKOTA AGRICULTURAL PRODUCTS UTILIZATION COMMISSION

Mr. McIlroy. I want to thank you, Congressman Dorgan, for inviting me to testify. In my written statement I have put down some figures of what six ethanol plants, producing 94 million gallons per year, would do for the gross national product in the United States and for North Dakota, and have went on to say what it would do for the treasury in State government and in Federal Government.

I'll leave that information for the committee to read. I will make four suggestions. The commission I work for recommends that the Federal tax incentives that you have should be available to all agriculturally derived renewable fuel projects. Vegetable oils, alcohol fuels, from agricultural products, would allow us to have agricultural material both in diesel fuel and in gasoline and help our agricultural community.

Second, the Congress should stabilize the Federal tax incentives. I suggest that you set up an organization that would detail the tax incentives and put the terms down. This organization could be a renewable fuels corporation that would run the program under some broad general guidelines set down by Congress. You know better how that might be done than I do.

Third, the excise tax exemption for alcohol fuels should be high enough to produce a market in all 50 States, and get the State governments out of at least part of the tax incentives they now have, so we'll get uniformity across the Nation.

The fourth point, the energy investment-tax credit that has not been reinstated, should be reinstated to help pay for these plants.

[The prepared statement follows:]

Statement of Dean L. McIlroy, Ph.D., Director, North Dakota Agricultural Products Utilization Commission

I thank you, Honorable Byron L. Dorgan, United States Representative for the great state of North Dakota, for allowing me to testify on behalf of the North Dakota Agricultural Products Utilization Commission (APUC) at this hearing to examine the tax incentives available for the production and use of domestically produced renewable ethanol fuels.

These tax incentives are very important for the development of the ethanol industry. They are a positive program to develop agricultural processing plants for ethanol production. A 50 million-gallon-per-year (mgpy) plant processing corn-to-ethanol in North Dakota could generate $177 million annual economic activity. About half of this activity would be from production activity which is already occurring and about half the activity would come form processing raw agricultural materials into ethanol. Six North Dakota ethanol projects representing 94 mgpy would produce about $333 million worth of economic activity from production and processing. These figures come from a study done by Research Planning Incorporated in Washington, D.C.

They also found that ethanol production will increase the state and federal taxes collected. In spite of tax incentives and tax credits at the state and federal level for ethanol production, it was determined that $4 million state taxes and $15 million federal taxes would be collected due to the production and processing activity represented by a 50 mgpy ethanol plant. Thus, we can calculate that the above six projects would be involved in generating about $7.52 million and $28.2 million in state and federal taxes, respectively.

Financing ethanol plants could improve U.S. foreign exchange. The U.S. gross national product (GNP) would be increased $1.89 per bushel if exported corn were processed into ethanol with the resulting dried distillers grains and solubles (DDGS) exported. The net value of the foreign trade would increase five cents a bushel of corn processed. From the above two conclusions by Research Planning Incorporated, we can calculate that the 1979 corn crop of 7.7 billion bushels with 32% exported as livestock feed, would have raised the U.S. GNP by $4.6 billion and improved our foreign exchange by $123 million, if the exported corn had been processed into ethanol for domestic use and the DDGS exported. Firming up financing with a loan guarantee would help North Dakota to contribute to a strong American economy.

Developing an ethanol industry in North Dakota would create jobs for North Dakota and many other states. In a study done by Employment Research Associates in Lansing, Michigan, it was concluded that over 960,000 new jobs would be generated by the construction, operation, and servicing of $12 billion worth of alcohol fuel plants producing six billion gallons of ethanol per year. This tells us that above six plants mentioned would generate 15,040 jobs. It appears that 6,407 of these jobs would be in the construction industry that makes all of the materials that would be used in the construction of ethanol plants and other services needed by the materials construction industry. Another 7,520 jobs would be created to erect the plants, make the equipment, supply services, truck transportation, yeast, inorganic chemicals, coal, electricity, gas, wholesale and retail trade activity. The permanent operation, maintenance, and supply activity in these ethanol plants would develop 1,113 more jobs.

North Dakotans need to export "value-added" products instead of raw materials, to increase economic activity and reduce the amount of transportation required to market raw agricultural materials. The various agricultural commodity councils and commissions, governors, and various federal agencies have done a fantastic job developing agricultural export markets for raw agricultural materials during the decade of the 1970's. Much of this progress was lost when the grain embargo was put in place by the Carter Administration. North Dakota really needs to export "value-added" products to reduce transportation costs to population centers and markets. We need to develop agricultural processing plants to produce new "value-added" products to use as liquid fuel and animal protein supplements in our domestic and our export markets. We need the ethanol industry as an alternative market to reduce stored agricultural raw materials. Loan guarantees from FmHA are needed to stimulate the financing of these ethanol plants.

First, the APUC recommends that these tax incentives be made available to all agriculturally-derived renewable-fuels. This recommendation is made to help promote the production of ethanol for the commercial octane market, methane gas for farm use as a source of heat, vegetable oil as a diesel fuel extender, and vegetable oil-alcohol esters as a diesel fuel replacement or extender on farms and for commercial use. Extending these tax incentives would help produce more processing of agricultural high-value products to be sold into markets not now available to agriculture. A significant portion of these tax incentives would be offset by the decreased cost of grain storage costs incurred by the Commodity Credit Corporation due to lowered surplus grain stocks.

Second, the APUC recommends that the Congress of the United States take these tax incentives out of the political arena by establishing a Renewable Fuels Corporation (RFC). The RFC would be responsible for developing the tax incentives and their period of activation so they promote agriculturally-derived fuel production and use across all 50 states. The ethanol loan guarantee programs would be shifted from the Department of Agriculture and the Department of Energy to the RFC to administer. The loan guarantees would be available to all agriculturally-derived renewable-fuels projects. Since the Synthetic Fuels Corporation has not been able to find viable synthetic fuels projects, their unused money should be transferred to RFC to finance the loan gurantees. The RFC would be required to report to Congress periodically about the specifics of their program so Congress could set overall policy and direction of the Corporation's program.

The APUC feels the establishment of the RFC is important to add stability to the present and future tax incentive programs. To date, either one or all of the tax incentives for ethanol production have been reviewed and reworked every year since they were instituted. The financial firms have reluctantly backed away from various projects in North Dakota because of the instability they perceive in the various tax incentive programs. The latest North Dakota ethanol plant project to be put on hold is the American Energy, Inc.-Ashland Oil Company's 50 million gallon per year plant project, which occurred two weeks ago.

Third, the APUC would strongly recommend the excise tax exemption for alcohol fuels apply to vegetable oil mixtures and fuels to be increased from six cents to nine cents per gallon. This would give an incentive for a market to develop in all 50 states. We need the market to develop all across America.

Fourth, the APUC recommends that the Energy Investment Tax Credit should be reinstated to help new projects pay debt service. This credit would offset part of the cost of high interest rates charged on loans today.

In summary, these recommendations would develop the processing of agricultural products and wastes into any agriculturally-derived renewable-fuel and expand the markets available to agriculture products, take the tax incentives out of the political arena into an RFC that would stabilize the incentive programs, develop the tax incentives so they would develop a national market across all fifty states, and develop a supply of agriculturally-derived fuel that will work in both gasoline and diesel engines to insure a local fuel supply for agriculture in times of national emergency.

Mr. DORGAN. Thank you very much, Dean. Next we will call on American Agriculture Movement chairman, Jerome Hickman, from Columbus, ND.

STATEMENT OF JEROME HICKMAN, STATE CHAIRMAN, AMERICAN AGRICULTURE MOVEMENT OF NORTH DAKOTA, AND MEMBER, AMERICAN ENERGY, INC., NORTH DAKOTA ALCOHOL CO-OP

Mr. HICKMAN. Congressman Dorgan, members of the committee, I'm Jerome Hickman, State chairman of the American Agriculture Movement.

I come from a long family line of short people and I will definitely keep it short. And I can understand why Congressman Dorgan would like to see it short, also.

American Agriculture Movement has, since its birth in a service station in Campo, CO, 8 years ago, recognized the fact that alcohol fuel was an acceptable alternative energy source.

As an additive to gasoline, it makes an efficient, clean-burning fuel that not only helps clean up the air, but also adds life to the engine that burns it. You'll have to excuse my grammar; I've been talking to grasshoppers the last 3 weeks and they don't seem to care how you talk. They just understand action.

And I think that's what we're here for—is action.

Incidentally, the cost of killing grasshoppers is about the same as building an alcohol plant. I want you to know that, folks.

I do not consider myself an authority on alcohol or alcohol fuels. I'm not an economist or a chemist. I and the people I represent are producers that have been turned into nonproducers.

Let me clarify that statement. With the use of chemicals and fertilizers, we have continued to increase our production each decade. While consumption has increased, it isn't keeping up with our ability to produce. Hence, we idle the land which in turn adds to the cost of production.

Wheat, corn, barley, and grain sorghum are excellent sources of ethanol. Ethanol can be extracted and the byproducts, such as meal, still maintain high feed qualities. As animal feed, the meal is very high in protein—this makes for leaner meats as the starch is used up in the alcohol. The one exception to this is the use of wheat.

In addition to the cattle feed, there is also an edible meal which is very high in protein. I see this edible meal as an excellent export product to the starving people of the world, as well as an acceptable substitute for red meat which has been put down as unhealthy.

There is no doubt that the making of ethanol from grain allows us to make the very best use of the crops that we grow. It could also put some of the farmers back on the taxpaying rolls.

I am a member of two alcohol co-ops: One has done nothing for a couple of years; the other has put in 6 years of hard work and has spent about $4.5 million of the 1,100 members' money trying to get us an ethanol plant. At the present time, it looks as though the plant is a no-go. Among the reasons cited was the likely repeal of the special energy investment tax credit. This is the second time I have heard this in the past 3 years.

It seems each time we get close to financing, this same rumor surfaces. This may or may not be a rumor—which is immaterial; it appears to have been enough to stop the financing.

It is said that if you don't have a probable solution, quit your complaining. If the Government would make just $1 billion, and I say that kind of funny because a few years ago, I didn't even know what $1 billion was, and now that's all we hear—but if they would just make $1 billion available to co-ops or private corporations at REA rates, we would produce 500 million gallons of ethanol per year from 150 million bushels of corn, barley, or grain sorghum.

These loans would soon be paid back and our surplus would dwindle and allow farmers to once more be a productive segment of the economy. It is my feeling that there is not enough private money available to construct enough alcohol plants to make a noticeable dent in our production capabilities.

Considering the administration's wish to have a huge store of weapons, it would seem logical that we should have the capability of supplying our own fuel, rather than relying on such vulnerable areas as the Persian Gulf.

I wish to thank the committee for taking the time and having enough concern to conduct this hearing. We appreciate your past efforts, and look forward to even more favorable legislation in the future.

Mr. DORGAN. Jerome, thank you very much for your testimony. We appreciate it.

John Ross, there's an important phone call. Is John Ross in the room? All right.

Next, we will hear from Leland Swenson, president of the South Dakota Farmers Union. Leland, welcome. We will make your full statement a part of the record.

STATEMENT OF LELAND SWENSON, PRESIDENT, SOUTH DAKOTA FARMERS UNION

Mr. SWENSON. Thank you, Mr. Chairman. I'd like to take this opportunity to thank you and the members of the committee for scheduling this important hearing in Sioux Falls.

I know of no one in Congress who's worked harder or more diligently on behalf of alcohol fuel than our representative Tom Daschle. Four or five years ago, alternative energy development in alcohol fuels in particular were glamor issues, that is, unfortunately not true today.

I feel that we owe a debt of gratitude to the persistence of Representative Daschle and you, members of this committee, and a few other members of Congress, for keeping this important issue alive.

It seems like only yesterday we were in the midst of an energy crisis of the late 1970's. Soaring petroleum prices and long lines at gas pumps made energy independence a national goal.

Farmers recognized that the development of alcohol fuels could create an important new market for their production, while also helping this Nation to achieve a much greater degree of energy independence. At the same time Congress approved the current Federal excise tax exemption, and a number of States including South Dakota took similar action.

Congress and the Carter administration also took important steps towards providing necessary funding for research and development. It indeed seemed like a new era of progress and rapid development of alternative energy sources was at hand.

However, I'm afraid, that we underestimated what would happen. Through a temporary and modest reduction in prices and profits, oil companies have also succeeded in lulling the American people into a false sense of security.

Meanwhile, at the State level, shortsighted concerns over highway funding have been used as a pretext for the persistent assault on the modest tax exemptions originally granted to encourage alcohol fuel production.

It is important to recognize that alcohol fuels is neither a panacea for American energy needs, nor for farm policy. That alcohol fuel can play an important role in solving both problems despite the active opposition the major oil companies and the administration, we have made some progress.

We believe that the immediate goals cited by Congressman Daschle and a recent series of meetings, in South Dakota, merit a strong support for family farmers and ranchers.

No. 1, we agree that the Federal excise tax exemption for alcohol fuels should be preserved and strengthened from the current 5 cents to at least 6 cents or more.

We also believe that it is crucial that existing State exemptions also continue and that additional States be encouraged to take similar action.

We agree that No. 2, we agree that the establishment of a strategic alcohol fuel reserve should be established.

No. 3, we strongly agree that the administration must be pressured to utilize existing authority to provide funding assistance for the development of ethanol fuel production facilities.

And No. 4, we also agree that the new alcohol fuel development legislation is needed, either as part of the 1985 farm program, or through separate legislative initiative.

Every knowledgeable observer agrees that sooner or later, America will again be confronted by rising energy prices and shortages in supply. At the same time, more than 3 years of disaster level farm prices are forcing family farmers and ranchers off the land in record numbers.

The question we should be asking is not, Why develop alcohol fuels? The question really ought to be: Why in Heaven's name have we done so little? and Why don't we act now?

Years ago, farmers union leaders cautioned us not to follow the example of a pack of hounds who chased after one rabbit, and then another and another until they became exhausted, without ever catching a single rabbit. The message of that little analogy was the value of persistance. As we work toward our goal of achieving the full potential for alcohol and other alternative fuel development, we must recognize that we must overcome powerful entrenched special interests.

It will not be easy, but our goal is worth the effort.

And attached to the copies of the testimony you have, is the copy of the exact policy position of our organization for your record.

[The prepared statement follows:]

STATEMENT OF LELAND SWENSON, PRESIDENT, SOUTH DAKOTA FARMERS UNION

My name is Leland Swenson. I am president of the South Dakota Farmers Union, our state's largest farm and ranch organization. I am also a member of the Executive Committee of the National Farmers Union. The following testimony is presented on behalf of both the South Dakota and National Farmers Union.

Mr. Chairman, I would like to take this opportunity to thank you and the members of the committee for scheduling this important hearing in Sioux Falls. I know of no one in Congress who has worked harder and more diligently on behalf of alcohol fuel development than has Rep. Tom Daschle. Four or five years ago, alternative energy development and alcohol fuels in particular were glamour issues. That is, unfortunately, not as true today. I feel that we own a debt of gratitude to the persistance of Rep. Daschle and a few other member of Congress for keeping this important issue alive.

It seems like yesterday that we were in the midst of the energy crisis of the late 1970's. Soaring petroleum prices and long lines at the gas pumps made energy independence a national goal. Farmers recognized that the development of alcohol fuels could create an important new market for their production while also helping this nation to achieve a much greater degree of energy independence.

At the same time Congress approved the current federal excise tax exemption and a number of states—including South Dakota—took similar action. Congress and the Carter Administration also took important steps toward providing necessary funding for further research and development.

It, indeed, seemed like a new era of progress and rapid development of alternative energy sources was at hand. However, I am afraid that we underestimated the power of the major oil companies. They recongized that they could not control a farm-based fuel technology and, with the cooperation of the Reagan Administration, they have succeeded in virtually wiping out federal funding of alternative energy development. Through a temporary and modest reduction in prices and profits, they have also succeeded in lulling the American people into a false sense of security. Meanwhile, at the state level, shortsighted concerns over highway funding have been used as a pretext for a persistent assault on the modest tax exemptions originally granted to encourage alcohol fuel production.

It is important to recognize that alcohol fuels are neither a panacea for America's energy needs nor for farm policy. But alcohol fuel can play an important role in solving both problems. Despite the active opposition of the major oil companies and the Administration, we have made some progress.

We believe that the immediate goals cited by Congressman Daschle in a recent series of meetings in South Dakota merit the strong support of family farmers and ranchers.

We agree that the federal excise tax exemption for alcohol fuel should be preserved and strengthened from the current five cents, to at least six cents or more. We also believe it is crucial that existing state exemptions also be continued and that additional states be encouraged to take similar action.

We agree that establishment of a strategic alcohol fuel reserve should be established.

We strongly agree that the Administration must be pressured to utilize existing authority to provide funding assistance for the development of ethanol fuel production facilities.

We also agree that new alcohol fuel development legislation is needed—either as a part of the 1985 Farm Bill or through separate legislation initiative.

Every knowledgeable observer agrees that sooner or later America will again be confronted by rising prices and shortages in supply. At the same time, more than three years of disaster level farm prices are forcing family farmers off the land in record numbers. The question we should be asking is not: Why develop alcohol fuels? The question really ought to be: Why, in Heavens name, have we done so little? Why don't we act now?

Years ago, Farmers Union leaders cautioned us not to follow the example of the pack of hounds who chased after one rabbit, and then another and another until they became exhausted—without ever catching a single rabbit. The message of that little analogy was the value of presistence. As we work toward our goal of achieving the full potential for alcohol and other alternative fuel development, we must recognize that we must overcome powerful entrenched special interests. It will not be easy, but our goal is worth the effort.

Thank you.

ALTERNATE ENERGY SOURCES

1. Development

Programs for the development of solar, geothermal, wind, hydrogen, methane, gasohol, alcohol, and other non-polluting renewable energy sources should be conducted, with special emphasis on solar energy and gasohol research directed toward developing self-sufficient units suitable for farm, home, small industry, and business use.

We strongly urge that the farm cooperative system pursue development and marketing of gasohol and alcohol through its network of local and regional cooperatives to enable producers to retain some control over their commodities.

2. Alcohol

Rapid development of alcohol fuels and other fuels from renewable sources, together with the development of synthetic fuels, will help achieve a larger degree of energy self-sufficiency.

We are, therefore, appalled by the actions of the Administration in reducing the federal investment in alcohol fuels production and abandoning the federal role in synfuels research and development. Abdicating federal responsibility for promoting these alternate fuel sources leaves the field to the forces which dominate the petroleum industry.

An alcohol fuels program utilizing renewable resources should be established through low-interest federal loans, in the same way rural electricity and rural telephones were established.

The Farmers Union urges Congress and the Administration to launch an alcohol fuels program to include:

(a) Strong support for federal legislation to further provide for conversion of farm products and byproducts into alcohol. Using renewable resources will save substantial amounts of oil and stabilize and improve farm income. Special emphasis should be given to production systems stressing on-farm and local cooperative site development, and extend the ASCS storage facility loan program to include alcohol production units.

(b) Federal legislation that permanently would extend the federal gasoline excise tax exemption on gasohol. This would allow a better time frame in which alcohol production plants could be constructed to take advantage of a better payout situation, and would encourage investments now to help stabilize state or national gasohol programs.

(c) The Department of Energy to act immediately to place ethanol production from biomass on its priority list for rapid commercialization between the present and the year 1990.

We encourage state legislation granting tax credits on each gallon of gasohol sold within each state.

3. Cooperative demonstrations

We urge consumer-owned utilities to unite to develop, demonstrate, and increase the economic feasibility of the use of renewable and other alternate energy systems.

4. Economic assistance

Our public policy should be designed to enhance the economic feasibility of the uses of renewable and other alternate energy systems by such means as government-sponsored research, and low-interest, long-term credit to consumer-owned utilities and to individual energy consumers.

Government loans under FmHA should be made available to family farmers to establish self-sufficient energy systems, such as solar, wind, or methane, in order to reduce peak load requirements on centralized energy systems.

We urge utilization and funding of the Section 5 program of the Rural Electrification Administration to provide low-interest loans to rural electric cooperative members to carry out energy conservation measures on their farms and rural residences.

5. Conservation

One immediately available alternate energy source lies in the adoption of all methods to conserve present-day supplies of energy. Future use based on austerity and wise application should be encouraged.

We call upon this Administration to provide leadership in energy conservation activities.

Mr. DORGAN. Mr. Swenson, thank you very much for your testimony.

Next, we will hear from Durand Young who's vice president of public relations of the South Dakota Auto Club. Mr. Young.

STATEMENT OF DURAND C. YOUNG, VICE PRESIDENT, PUBLIC AFFAIRS, SOUTH DAKOTA AUTO CLUB, INC., AND ON BEHALF OF THE AMERICAN AUTOMOBILE ASSOCIATION, AND HIGHWAY USERS FEDERATION

Mr. YOUNG. Thank you, Mr. Chairman, Congressman Jacobs, Congressman Daschle.

Thank you for the opportunity for a Christian to come into the arena of lions here.

I'm here this morning on behalf of AAA South Dakota and the Highway Users' Federation. We appreciate the opportunity to present our views on this important subject.

I am an individual member of the federation and have been active in federation affairs since 1963. I'm also past-chairman of the South Dakota Highway Users' Conference and independent organization affiliated with the federation and made up of transportation leaders in this State.

I should point out that the South Dakota Highway Users' Conference policy, and I'm not speaking on their behalf today, but their policy is to encourage the development of alcohol fuels as a supplement to conventional highway fuels.

My remarks this morning will be confined to excise tax exemptions for alcohol fuel mixtures and alcohol fuels.

It is time to begin phasing out the tax exemptions for gasohol at both Federal and State levels for these reasons: the gasohol exemption is narrowing the base of funding for the Nation's highway program at a time when the need is for increased funding.

Energy conservation efforts and more fuel efficient vehicles have had a tremendous impact on highway user revenues. The 5 cents per gallon increase in the Federal motor fuel tax in the 1982 Surface Transportation Assistance Act, was intended to help meet those needs.

The growth of the gasohol exemption, which amounts to over $391 million in revenue loss to highways in 1983 because of Federal and State exemptions, and with no end in sight, is simply counterproductive in meeting the highway needs of this country.

Taxes and fees paid by highway users in proportion to their use of the roads and the streets provide the revenue to take care of our highway facilities.

The irony of the gasohol exemption is that gasohol consumers are not paying their fair share of these highway revenues. They are getting a free ride at the expense of other users. In the end, the highway transportation system of the States and the Nation suffers.

While energy conservation-related reasons may have made the gasohol exemption attractive in the past, we are well beyond the point where a narrow segment of the public should be called upon to continue subsidizing what was once viewed as a fledgling industry. There is a question whether anyone should be subsidizing the alcohol fuel industry.

Free market forces, not subsidies, should determine the operation of the energy market. There is ample evidence that it works well and it is in the consumers' interest.

Decontrol of crude oil led to reductions in costs and increases in supply of motor fuels. The National Synthetic Fuel Subsidy Program is running into problems, as we all know.

Deregulation of all natural gas is under consideration in Congress. Gasohol should be given the chance to prove it can make it on its own. There is evidence that gasohol can compete without subsidy.

Oklahoma gives no State or fuel tax exemption for gasohol, yet gasohol makes up about 4 percent of the total motor fuel sales volume in that State, putting Oklahoma among the top 18 gasohol consuming States.

Highway users there are free to burn gasohol if they wish, and the State's highway program doesn't suffer the revenue loss.

Mr. Schwandt, I believe it was, in the press conference, earlier this morning, said that gasohol represents just over 4 percent of the Nation's motor fuel usage. That's about the same as what is occurring in Oklahoma without the State tax subsidy.

Congress has consistently underestimated the revenue loss to the highway trust fund from the gasohol exemption.

The 4 cent exemption provided in the 1978 Energy Tax Act was estimated to reduce Federal receipts to the trust fund by some $5 million through 1983, or as of 1983.

In fact, the loss was $221 million in 1983, according to Treasury and Department of Transportation figures.

If the industry is growing that fast, certainly it should be able to compete in the marketplace.

The windfall profits tax of 1980—so-called windfall profits tax—extended the gasohol exemption until December 31, 1992. The estimated revenue loss at that time was around $7 million for 1983, and it was forecast to rise to about $347 million by 1990.

The gasohol exemption went to 5 cents per gallon in 1983, when the 1982 Surface Transportation Assistance Act hiked the Federal motor fuel tax a nickel.

And Congress OK'd the raising of the gasohol exemption to 6 cents as a part of its budget deficit reducing tax bill a couple of weeks ago.

Let me close by suggesting that the single most important thing that needs to be done is to stop the hemorrhaging of highway funds through subsidies and diversions of user fees and taxes. The way to start this is by phasing out the Federal motor fuel tax exemption for gasohol.

States are beginning to see the disastrous consequences of their gasohol exemptions on State highway revenues.

Three States in 1984 have limited or removed the gasohol subsidy and I would urge Congress to do the same with regard to the Federal gasohol exemption.

Thank you very much for the opportunity.

[The prepared statement follows:]

Statement of Durand C. Young, Vice President, Public Affairs, AAA South Dakota Auto Club, Inc.

I am Durand Young, Vice President for Public Affairs, AAA South Dakota. I'm here this morning on behalf of AAA South Dakota and the Highway Users Federation. This opportunity to present our views on this important subject is appreciated.

I am an individual member of the Federation and have been active in Federation affairs since 1963. I am also past chairman of the South Dakota Highway Users Conference, an independent organization affiliated with the Federation, and made up of transportation leaders in this state. The South Dakota Highway Users Conference has not taken a position on gasohol as of this date.

I will confine my remarks this morning to the excise tax exemption for alcohol fuels mixtures and alcohol fuels.

It's time to begin phasing out the tax exemptions for gasohol at both the federal and state levels. for these reasons:

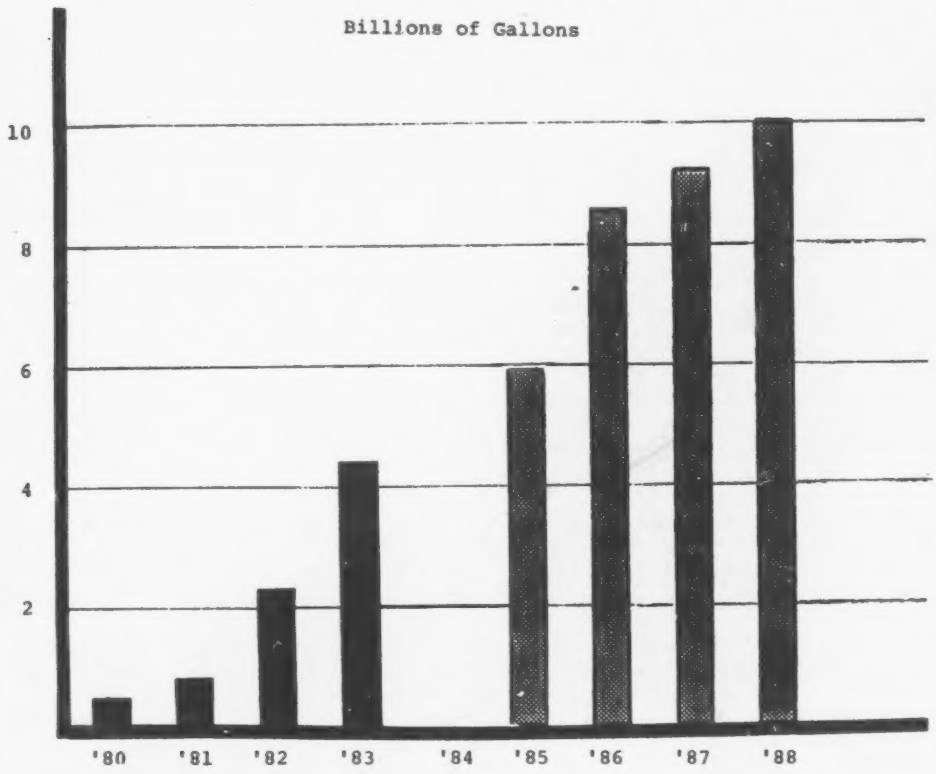
The gasohol exemption is narrowing the base of funding for the nation's highway program at a time when the need is for increased funding. Energy conservation efforts and more fuel-efficient vehicles have had a tremendous impact on highway user revenues. The five cents per gallon hike in the federal motor fuel tax in the 1982 Surface Transportation Assistance Act was intended to help meet those needs. The growth of the gasohol exemption—over $391 million revenue loss to highways in 1983 because of federal and state exemptions, and with no end in sight—is simply counter-productive in meeting highway needs.

Taxes and fees paid by highway users in proportion to their use of roads and streets provide the revenue to take care of our highway facilities. The irony of the gasohol exemption is that gasohol consumers are not paying their fair share of these highway revenues. They are getting a free ride at the expense of other users. In the end, the highway transportation system suffers.

While energy conservation-related reasons may have made the gasohol exemption attractive in the past, we are well beyond the point where a narrow segment of the public should be called upon to continue subsidizing what was once viewed as a fledgling industry. There is a question whether anyone should be subsidizing the alcohol fuels industry.

Free market forces, not subsidies, should determine the operation of the energy market. There is ample evidence that it works well, and in the consumer's interest. Decontrol of crude oil led to reductions in cost and increases in supply of motor fuels. The national synthetic fuel subsidy program is running into problems. Deregulation of all natural gas is under consideration in Congress. Gasohol should be given the chance to prove it can make it on its own. (See fig. No. 1.)

FIGURE NO. 1.— GASOHOL SALES



Source 80-83 DOT from state sources
85-88 Office of Program & Policy Planning, FHWA
7/1/84

There is evidence that gasohol can compete without subsidy. Oklahoma gives no state motor fuel tax exemption for gasohol. Yet gasohol makes up about four percent of the total motor fuel sales volume in that state, putting Oklahoma among the top 18 gasohol consuming states. Highway users there are free to burn gasohol if they wish, and the state's highway program doesn't suffer the revenue loss.

Congress has consistently underestimated the revenue loss to the Highway Trust Fund from the gasohol exemption:

The four cent exemption provided in the 1978 Energy Tax Act was estimated to reduce federal receipts to the Trust Fund by less than $5 million through 1983. In fact the loss was $221 million in 1983, according to Treasury and Department of Transportation figures. (See fig. No. 2.)

FIGURE 2.—GASOHOL—1983

State	Exemption (cents)	Quantity (million gallons)	Percent of market	Revenue loss (millions of dollars)	Revenue loss (percent)
Alabama	3	30	1.6	0.9	0.28
California	3	481	4.4	14.4	0.65
Colorado	5	57	3.6	2.8	1.26
Florida	4	357	7.0	14.3	0.28
Illinois	[1] 5	[2] 416	9.0	20.8	2.74
Indiana	[3] 3.75	[2] 536	21.6	20.1	4.51
Iowa	3	510	36.6	15.3	4.62
Kansas	5	67	5.4	3.4	1.69

FIGURE 2.—GASOHOL—1983—Continued

State	Exemption (cents)	Quantity (million gallons)	Percent of market	Revenue loss (millions of dollars)	Revenue loss (percent)
Kentucky	3.5	101	5.8	3.5	0.91
Michigan	4	566	15.4	22.6	3.26
Nebraska	5	183	23.6	9.2	5.39
New Mexico	11	27	3.6	2.9	1.82
Ohio	3.5	458	9.9	16.0	1.67
Oklahoma	0	76	3.9	0	0
South Dakota	4	32	8.1	1.3	1.53
Texas	5	282	3.4	14.1	0.94
Utah	5	29	4.1	1.5	1.30
Virginia	8	46	1.8	3.7	0.65
All other States	[2] 2	181	....	3.6	....
United States	5	4,435	4.2	22.2	1.8
Total loss in 1983				391.6	....

[1] 4 percent. [2] Estimate. [3] 3 percent.

The Windfall Profits Tax of 1980 extended the gasohol exemption until December 31, 1992. The estimated revenue loss at that time was around $7 million in 1983, rising to about $347 million in 1990.

The gasohol exemption went to 5 cents per gallon in 1983, when the 1982 Surface Transportation Assistance Act hiked the federal motor fuel tax a nickel.

Congress okayed the raising of the gasohol exemption to 6 cents as part of its budget deficit-reducing tax bill a couple of weeks ago.

Let me close my remarks by suggesting that the single most important thing that needs to be done is to stop the hemorrhaging of highway funds through subsidies and diversions of user fees and taxes. And I can think of no better way to start this than by phasing out the federal motor fuel tax exemption for gasohol. States are beginning to see the disastrous consequences of their gasohol exemptions on state highway revenues. Three states in 1984 have limited or removed the gasohol subsidy. I would urge Congress to do the same with regard to the federal gasohol exemption.

Thank you.

Mr. DORGAN. Thank you.

Mr. DASCHLE. Thank you, Mr. Young. When you refer to gasohol, are you referring to all ethanol fuels and alcohol fuels?

Mr. YOUNG. Yes, Congressman, I am.

Mr. DASCHLE. So you just use gasohol as a——

Mr. YOUNG. I understand gasohol is a trademark word and so forth, but I'm——

Mr. DASCHLE. OK. Our final witness is Mr. Tom Doyle. Mr. Doyle. If you wish to proceed?

STATEMENT OF THOMAS D. DOYLE, DOUGLAS COUNTY ENGINEER, DOUGLAS COUNTY, NE

Mr. DOYLE. Thank you, Mr. Chairman, members of the committee, Congressman Jacobs.

My name is Thomas D. Doyle.

I'm here as a person who has had some experience in government and who is currently an elected public official responsible for the construction and maintenance of highways in Douglas County, NE.

Prior to my assuming these duties, I served in the Nebraska State Legislature on the public works committee where we dealt with highway matters, gasohol matters, et cetera.

Prior to that time, for almost 7 years, I was the director-State engineer of the Nebraska Department of Roads serving under then Gov. J. James Exon, who is now our junior Senator from Nebraska.

I am a registered professional engineer with a specialty in chemical engineering and I'm here today to talk about the excise tax specifically. Unlike Mark Antony at Julius Caesar's funeral, who said "I come here to bury Caesar, not to praise him," I assure you that I come here to praise gasohol, not to bury it. I use the term "gasohol" in its generic sense, meaning all alcohol related fuels.

I am here to offer to you some information that I hope will be helpful to you in your consideration of future energy policy which will not be tied to the Federal excise tax gas exemption, nor to the State gas tax exemption for gasohol.

And I think it's important that we recognize what is happening, at least at the local level in the various States.

I have submitted four exhibits, one of which is an exhibit which shows, at least in the State of Nebraska, that our usage of gasohol has dramatically increased. And I'm extemporizing at this point. In the first 5 years, since 1979, which was a partial year, of the exemptions until 1983, some $19 million of revenues were lost to the State of Nebraska and its political subdivisions as a result of Nebraska's 5 cents gasohol exemption.

And of that $19 million, more than half of those revenues were lost in 1983, that single year alone. It's apparent from our past experience and our current projections that in States like, at least Nebraska, and I think in some of the other States, too, if you'll look at the information, it'll bear it out, that this is not a straight line but a geometric type of curve. And it indicates two things:

No. 1, that gasohol is catching on where it's promoted, promoted vigorously.

And, No. 2, that we're heading into the danger zone in terms of being able to fund the repair, the maintenance, and the upgrading of the highway and bridge systems within those States.

And I suspect that will eventually become a problem at the Federal level as well. I heard in earlier testimony that 4 percent is the average rate of gasohol consumption nationally. In Nebraska, based on 1983 figures, 19, almost 20 percent—19 and some fraction of a percent—of the fuel used in motor vehicles, exclusive of diesel, is gasohol. And this has great implications for our future ability to continue to do the things we need in order to provide the transportation system necessary to move these agricultural products to market.

So I urge you that as you consider your future energy policy, that perhaps the time has come to consider not an adversarial position with the Highway Users Federation, the various highway lobby interests over the country, but rather perhaps the time has come to join hands with them. With a quid pro quo saying, all right, we'll leave your gasoline alone, we'll take off your exemption, the exemption for gasohol fuels, if you will recognize and join with us in a very necessary national commitment of the development of an alternative fuel for the future.

It seems to me that one of the real bargaining chips that you have there in the Congress is the fact that if, as was in the 1982 act done with the transit interests, where you bargained away 1 cent to transit in order to get the 4 cents for the gas tax increase, the time has now come to go to the highway interests and say, OK, we'll gradually remove that exemption if you will, in turn, support our thrust for the development of gasohol for the future.

I could comment on, you know, what kind of a subsidy that we're planning for jobs in the gasohol industry and the production of gasohol and the figures might range anywhere from $110 to $220,000 per job per year if you take the output and the number of gallons of gasohol that you produce and the amount of revenue that that denies to the local jurisdictions and the States. And you could argue that you could take that same $220,000, if that's a good figure, hire people at $20,000 a year, to go out and build roads and bridges and you might be just as well off from the standpoint of job production.

But I don't think that's what we ought to be looking toward. I think we ought to be looking toward a true national commitment in which all of the citizens of this country recognize and in which all of the citizens in this country who are able, participate in the financing of this particular program for the future.

I think it is folly to hang on to the exemption on gasohol, at least for the excise tax portion of it, and expect that's going to carry us on into the future. Maybe we ought not to be talking about 10 percent gasohol. Maybe we ought to be talking about 100 percent gasohol, or as close as you can get it, pure gasohol fuels for motor vehicles.

I understand in the 1984 act there is some incentive, I think a tax credit, for alcohol, a pure alcohol vehicle. Let's not think in terms of 10 percent; lets think in terms of 100 percent.

You get there 10 times quicker. Maybe that's how we ought to be approaching the future. My only purpose in being here today is as one who would like to tell the story from the standpoint of we local public officials out there who have to provide a safe and efficient transportation system and hopefully we can do it in concert with the production of alcohol as an alternative source of fuel.

If we want to do it, we can put a man on the Moon, and we can also put gasohol in the gas tank and other places, too. But, again, we've got to find the ways politically, and technically, and I suppose financially in order to bring this about.

I thank you for the opportunity of being able to present these remarks to you. I didn't find out about this meeting until I was in Nebraska City last week with a group of engineers, and your staff was very pleasant and accommodating and allowed me the opportunity to be with you and to present some of these remarks here today.

Thank you very much.

[The prepared statement follows:]

STATEMENT OF THOMAS D. DOYLE, DOUGLAS COUNTY ENGINEER, DOUGLAS COUNTY, NE

Mr. Chairman and Members of the committee, you are to be commended for affording this opportunity for interested persons and organizations to provide information and suggestions on the production and use of domestically produced renewable ethanol fuels, specifically gasahol.

I am presently the County Engineer for Douglas County, Nebraska. It is my responsibility to provide for the construction, repair and improvement of all county roads and bridges in our County.

I am a registered professional engineer in Nebraska, and my technical major is in chemical engineering. For 6½ years, I served under appointment of then governor J. James Exon (now U.S. Senator Exon) as the Director-State Engineer of the Nebraska Highway Department.

I have served as an elected Nebraska State Senator, and as a member of the Public Works Committee, which involved State Highways and Bridges and related matters. I am here today to present for your consideration some of the reasons that I believe support the contention that both Federal and State excise tax exemptions for gasohol should be eliminated or deemphasized.

Unlike Mark Anthony at Julius Caesar's funeral who said "I come here to bury Caesar, not to praise him," I want to emphasize to you that "I come here to praise gasohol not to bury it". I recognize and agree with the thesis that development of alcohol as an alternate fuel, and the implications for our national domestic energy independence is a legitimate and commendable national goal.

However, what I offer for your careful consideration is the thesis that gasohol subsidies through cents-per-gallon exemptions in the Federal (and State) excise taxes is the wrong way to pursue these goals.

The highway user tax concept has served this nation superbly. It has provided the means for building our national Interstate System, the federal aid primary and secondary roads systems, and state and local roads and bridges. These systems form the backbone of the infrastructure which serves the overall economic, social and recreation interests of all Americans.

But the future viability of the user tax is seriously threatened by the excise exemptions for gasohol. This problem has been recognized by the States, and the thrust at the State level is to eliminate and/or reduce the gasohol exemption.

I have with me, which I have marked Exhibit I, a summary of the status of the gasohol exemption in the states surrounding Nebraska. It is interesting to note that the 4 cent exemption here in South Dakota is scheduled to expire on July 1, 1985. Exhibit I also demonstrates that serious revenue losses are being experienced in these seven states: Nebraska, Iowa, Missouri, Kansas, Colorado, Wyoming, and South Dakota. Although I do not have data for other states or for the figures for the Federal Government, the losses will be great in these areas also.

These figures further indicate that the use of ethanol is increasing at a geometric rate. For example, in Nebraska the usage of gasohol in 1980, the first full year of the 5¢ state exemption, was about 30 million gallons versus 800 million gallons of gasoline used. Last year, 1983, gasohol usage was up to 183 million gallons versus 587 million gallons of gasoline.

From 1979 thru 1983, local (State) revenues lost totalled $16.9 million—but $9.1 million dollars of that amount, of 53 percent—was lost in 1983 alone. So you can see that these revenue losses are already a serious threat to our ability to build and maintain a safe and adequate transportation system.

But what about the arguments in favor of gasohol as an alternative fuel? I believe that several points need to be made to set the record straight. In the early 70's, advocates stressed that advancements in technology would provide the means for making this fuel economically viable in its own right. The arguments went "if we can subsidize this developing industry until it gets on its feet, we can eventually remove the subsidy".

But in the decade since, has this happened? Unfortunately no! I have marked as Exhibit II a brief summary of data which demonstrates that ethanol production today consumes 2½ times as much energy as its produces!

I have marked as Exhibit III, a brief summary of information which demonstrates that the potential impact of gasohol production in Nebraska on our corn prices would have virtually no impact on the state's grain prices. There are those who argue that gasohol plants will provide jobs, and that this is another reason for continuing the gasohol subsidy.

Exhibit IV reports on a $21 million gasohol plant which will go on stream in Hastings, Nebraska this fall. This plant will produce 10 million gallons of alcohol, or 100 million gallons of gasohol. This will generate a combined state and federal revenue loss of over $10 million. It would make more sense to use this $10 million to hire 5,000 people at $20,000 per year to build and maintain our highway systems.

Mr. Chairman, and members of the Subcommittee, I respectfully urge you to recognize that if the continued development of the gasohol industry is a legitimate national priority—and I do not dispute that it is—it should not be financed by continued excise (user) tax exemption. It should be encouraged and/or protected by other incentives—such as a duty on imported fuels and/or general fund revenues.

I thank you for this opportunity to present this information for your consideration.

EXHIBIT I.—STATUS OF GASOHOL EXEMPTIONS IN STATES SURROUNDING NEBRASKA

State	Current exemption (cents)	Phase out	Exemption expires
Iowa	3	July 1, 1984: 2 cent July 1, 1985: 1 cent	July 1, 1986.
Missouri	(1)	0	0
Kansas	5	0	No date set as this time.
Colorado	5	0	July 1, 1985 [2]
Wyoming	4	0	July 1, 1984.
South Dakota	4	0	July 1, 1985.

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[1] Has never had an exemption.

[2] A bill, S.B. 150, was introduced in the 1984 Colorado Legislature to extend the exemption to 1992. The bill was killed March 7, 1984.

STATE OF NEBRASKA

Year	Gasoline consumption	Gasohol consumption	Gasohol exemption (cents)	Exemption expiration
1979	903,386,000	[1] 4,765,000	5	
1980	807,941,000	29,692,000	5	
1981	759,755,000	31,023,000	5	
1982	696,127,000	89,698,000	5	
1983	587,181,000	183,106,000	5	No expiration date.

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[1] August through December.

Summary: Nebraska's gasoline consumption in 1983 was down 35 percent from 1979.

Nebraska's gasohol consumption in 1983 was up 517 percent over 1980 (first full year separate gasohol records were maintained).

Revenue lost from gasohol exemption from August 1, 1979, through December 31, 1983, for city streets, country roads, and state highways was $16,914,200—$9.1 million of which occurred in 1983.

STATE OF IOWA

Year	Gasoline consumption	Gasohol consumption	Gasohol exemption	Exemption expiration
1979	1,492,000,000	60,000,000	Subject only to 3 percent sales tax	
1980	1,219,000,000	156,000,000	......do	
1981	1,125,000,000	190,000,000	3 percent sales tax January–April 5 cents exemption May–August 7 cents exemption September–December.	
1982	787,000,000	493,000,000	7 cents exemption January–April 5 cents exemption May–December	
1983	[1] 788,000,000	[1] 499,000,000	5 cents exemption January–June 3 cents exemption July–December 2 cents exemption July, 1984 1 cent exemption July, 1985	Expires July 1, 1986.

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[1] Includes December, 1983 estimates.

Note.—Diesel fuel in Iowa has been taxed at 15.5 cents per gallon since July, 1982—Nebraska's tax did not reach that level until October 1, 1983.

Summary: Iowa's gasoline consumption in 1983 was down 47.2 percent from 1979.

Iowa's gasohol consumption in 1983 was up 732 percent over 1979.

With the variety of taxes levied on gasohol, it is difficult to determine the exact revenue lost without specific month-by-month data. However, multiplying 1983's estimated 499,000,000 gallons by an average 4 cents exemption throughout the year (reasonable methodology given 1982's gallonage) indicates a loss of $19.9 million in 1983 alone.

STATE OF MISSOURI

Year	Gasoline consumption	Gasohol consumption	Gasohol exemption	Exemption expiration
1979	2,600,240,336	Unknown	No exemption from the State's 7 cents gas tax.	0
1980	2,419,515,705	13,500,000 estimated	do	0
1981	2,376,797,484	10,500,000 estimated	do	0
1982	2,347,145,130	Unknown	do	0
1983	2,383,140,850	do	do	0

Summary: Missouri's gasoline consumption in 1983 was down 8.3 percent from 1979 (up 1.5 percent over 1982).

A special survey of oil jobbers was conducted by Missouri in 1980 and 1981 from which the gasohol consumption estimates for those years were obtained. Since it provides no exemption for gasohol, Missouri does not believe it necessary to maintain separate records for gasohol.

Obviously no revenue lost since there is no exemption.

Missouri constitution requires a vote of the people to increase the gas tax. Several efforts have been made to increase it in recent years, all unsuccessful.

STATE OF KANSAS

Year	Gasoline consumption	Gasohol consumption	Gasohol exemption	Exemption expiration
1979	1,286,969,000	Included in gasoline total.	5 cents per gallon	
1980	1,174,275,219	36,904,225	5 cents exemption January–June 4 cents exemption July–December	
1981	1,153,630,113	13,679,135	4 cents exemption January–June 3 cents exemption July–December	
1982	1,144,002,451	7,207,913	3 cents exemption January–June 2 cents exemption July–December	
1983	[1] 1,095,992,248	[1] 61,699,089	2 cents exemption January–June 4 cents exemption July–December	
			5 cents exemption January 1984	No expiration date.

[1] Includes December, 1983 estimates.

Summary: Kansas gasoline consumption in 1983 was down 14.8 percent from 1979.

Kansas gasohol consumption in 1983 was up 67.2 over 1980, first year separate gasohol gasohol records were maintained; however, there was a considerable drop in consumption in 1981 and 1982 (1983 up 756 percent over 1982).

STATE OF COLORADO

Year	Gasoline consumption	Gasohol consumption	Gasohol exemption	Exemption expiration
1979	1,560,518,430	Included with gasoline total.	No exemption	
1980	1,394,639,650	do	do	
1981	1,404,524,473	do	5 cents per gallon exemption enacted July 2, 1981.[1]	
1982	1,383,180,680	30,426,381	do	
1983	1,353,351,842	52,904,565	do	July 1, 1985.[2]

[1] Colorado's 5 cents per gallon exemption is "limited to such blended gasoline which is produced from no more than three million gallons of alcohol annually from each facility having a design production capacity of seventeen million gallons or less per year of such alcohol." Colorado Statutes: Sec. 39-27-102.

Specific data on revenue loss from exemption is not readily available, but the Colorado Department of Highways reports that the "great majority" of gasohol consumption qualifies for the exemption, and they refer to it as gasohol produced in Colorado.

[2] A bill, S.B. 150, was introduced in the Colorado 1984 Legislature to extend the exemption to 1992. The bill was killed March 7, 1984.

Summary: Colorado's gasoline consumption in 1983 was down 13.3 percent from 1979.

Colorado did not maintain separate gasohol records until 1982; 1983's consumption was 73.9 percent over 1982.

STATE OF WYOMING

Year	Gasoline consumption	Gasohol consumption	Gasohol exemption	Exemption expiration
1979	381,674,000	193,600	4 cents per gallon	
1980	373,723,000	611,000	do	
1981	375,068,000	846,000	do	
1982	359,425,000	259,000	do	
1983	[1] 358,563,000	[1] 270,039	do	July 1, 1984.

[1] Includes December, 1983 estimates.

Summary: Wyoming gasoline consumption in 1983 was down 6.1 percent from 1979.

Wyoming gasohol consumption in 1983 was up 39.9 percent over the 1979 figure; however, the 1983 consumption was down 68.1 percent from the high consumption year of 1981.

Revenue lost from gasohol consumption from 1979 through 1983 was $87,161.

STATE OF SOUTH DAKOTA

Year	Gasoline consumption	Gasohol consumption	Gasohol exemption	Exemption expiration
1979	447,673,000	2,272,000	None January–June 4 cents exemption July–December.	
1980	390,328,000	10,144,000	4 cents	
1981	374,773,000	6,473,000	do	
1982	359,044,000	13,383,000	do	
1983	[1] 341,000,000	[1] 30,000,000	do	July 1, 1985.

[1] Includes December, 1983 estimates.

Summary: South Dakota gasoline consumption in 1983 was down 23.8 percent from 1979.

South Dakota gasohol consumption in 1983 was 1,220 percent higher than it was in 1979; however, note the considerable fluctuation in 1980, 1981, and 1982.

Revenue lost from gasohol exemption since July 1, 1979 through December 31, 1983, estimated $2,490,880.

EXHIBIT II.—DOES ETHANOL PRODUCTION CONSUME MORE ENERGY THAN IT PRODUCES?

If corn is the product used in making fuel ethanol, it does require more energy than it produces. It takes 188,000 B.T.U.'s (British Thermal Units) of fossil fuel energy to produce one bushel of corn—that includes land preparation, cultivation, irrigation, and harvesting the corn—it does not include the energy it takes to produce the farm equipment used in production, nor the transportation required to get the corn to market or an ethanol plant.

It takes 350,000 B.T.U.'s of energy to ferment, distill and dry the residue of one bushel of corn—that makes a total of 538,000 B.T.U.'s of energy per bushel of corn.

A gallon of ethanol has an energy output of 85,000 B.T.U.'s.

One bushel of corn produces two and one-half (2.5) gallons of ethanol which then has a total energy output of 212,500 B.T.U.'s.

Subtract the energy output of 212,500 B.T.U.'s from the 538,000 B.T.U.'s it took to produce it, and the NET energy loss is 325,500 B.T.U.'s.

Yes, it consumes more energy than it produces!

EXHIBIT III.—IMPACT OF GASOHOL ON AGRICULTURE

The commercial production of ethyl alcohol from corn requires one (1) bushel of corn to produce 2.5 gallons of ethyl alcohol.

A normal corn production year in Nebraska will produce from 650 to 800 million bushels of corn.

In 1983, a total of 183,106,000 gallons of gasohol was consumed in Nebraska—that required 18,310,600 gallons of ethyl alcohol. If all of that ethyl alcohol had been produced in Nebraska from Nebraska corn, it would have taken 7,324,240 bushels of corn—that is less than one percent of a normal corn crop (.0097653 of 750,000,000 bushels, or .009155 of 800,000,000 bushels).

The gasohol industry hopes to have three commercial ethyl plants in operation in Nebraska by 1986 producing 50 million gallons of ethyl alcohol per year. That would require 20,000,000 bushels of corn which would utilize 2.7 percent (of a 750 million bushel crop) to 2.5% (of an 800 million bushel crop) which would have virtually no impact upon the state's general corn prices; however, corn sold in areas located by a plant would not have transportation costs.

Fifty million gallons of ethyl alcohol would produce 500,000,000 gallons of gasohol. If all of it were consumed in Nebraska, and the present 5¢ per gallon exemption remains, it will mean the loss of $25,000,000 per year in highway revenue for city streets, country roads, and state highways.

If the ethyl alcohol producers want to ship part of their production to other states, it is well to remember that the gasohol exemptions will have expired by that time in Wyoming and South Dakota, as it will have in Colorado also (and Nebraska ethyl alcohol might not qualify for that state's exemption anyway), that it will expire in Iowa by mid-1986, and Missouri has never had any exemption. Only Kansas has not yet set an expiration date of the states surrounding Nebraska. There would be no real market for Nebraska ethyl alcohol if exemptions are a necessary economic factor to its successful production.

EXHIBIT IV.—CONTRACTORS PUSH FOR OCTOBER DEADLINE ON ETHANOL PLANT

(By Marcia M. Gruver, Editor)

Contractors on a fast-track, turnkey ethanol plant project are striving to meet an October 1 deadline after being mired in a wet Nebraska spring. The $21 million plant, located on US 6 just east of Hastings, is the second ethanol plant constructed by owner American Development Corp. (ADC), Costa Mesa, Calif., and its construction manager, J.A. Jones Construction Co., Charlotte, N.C.

The two firms, along with Omaha-based designer Henningson, Durham & Richardson, built their first ethanol plant in Hamburg, Ia., 150 miles due east of Hastings. Already in operation, the $13 million Hamburg facility is expected to produce about 5 million gallons of ethanol per year. The Hastings plant will produce twice that amount, with ADC predicting that it will provide enough ethanol to meet a quarter of Nebraska's needs for the octane enhancer of gasoline.

In addition, both plants are expected to produce several thousand tons of distilled dried grain (DDG), a protein livestock feed by-product. Construction at Hastings began in September 1983 and is expected to peak in July with 200 construction workers on the site, according to Jim Cuthbertson, project manager for Jones. "We completed the site prep around the first of December," he says, "and we've been trying to do concrete ever since."

Those efforts have been hampered by the area's wet spring, which mired down access to the jobsite.

"We're having a hard time getting into the field to pour concrete with this wet weather," says Cuthbertson. "We just can't get equipment in there because of the mud." The project manager says that the installation of temporary roads on the jobsite has "helped somewhat" in solving the access problem. The construction of an ethanol plant, according to Cuthbertson, is similar to the construction of a brewery.

When completed, the plant will contain nine fermenters, three distillation columns, 150 centrifugal pumps, two decanters, two dryers and one boiler. The raw corn will go through milling and pre-fermentation processes before proceeding through the fermenters. Alcohol will be derived from a distillation process, after which the remaining corn mash will be dried to produce the DDG livestock feed. The process will require construction of an on-site 375 gallon-per-minute wastewater treatment plant.

Crew members currently are erecting the boiler, tanks and grain handling package. Piping installation began in mid-May and two to three construction packages are still in the final design process, according to Pat Byrne, project manager with designer Henningson, Durham & Richardson. "We're still working on the pH control and neutralization systems for the wastewater treatment plant," Byrne comments, "along with miscellaneous steel and support structures.

"However, we're still able to give contractors enough information so they can give us a price." In an unusual twist, ADC designated the Henningson firm as a subcontractor under Jones.

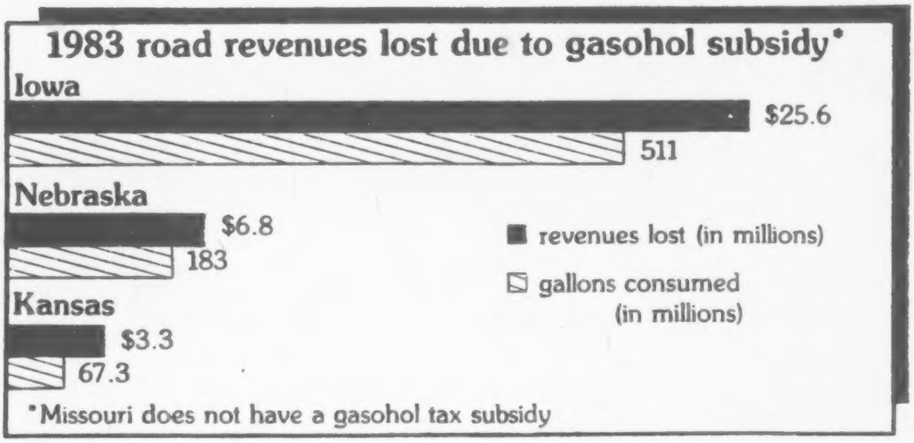
"Basically, it was a convenient way to quickly disseminate information and thus shorten our construction time span," says Mike Mikhail, project manager with ADC. "We have no problem with the situation," says Henningson's Byrne. "We are still maintaining the design control and providing the assurance that the plant will perform. Given a similar situation, especially with a guaranteed maximum price project like this, we'd do it again."

Still, Byrne says that the Jones firm is one of the few contractors his company would consider subcontracting under. The design firm has performed under this type of contractual arrangement before, most recently on a Louisiana waste treatment project. The tallest structure on the 40-acre site will be the 198-foot boiler stack. "We're presently using a 100-ton crane to erect the boiler," says Cuthbertson, "but I think that we'll probably end up with a 150-ton crane to install the distillation columns." Approximately 4,600 cubic yards of concrete, 250 tons of structural steel and 60,000 feet of steel pipe will be used on the project. "There're no exotic materials involved," Cuthbertson comments.

The project manager maintains that the job has had "very good deliveries. We had enough lead time in the beginning that one of our first activities was to go out and buy equipment," Cuthbertson says. "At Hamburg, we were ripping drawings off the table simultaneously with the concrete pours," says Byrne. "We've had a little bit more time at Hastings." According to Byrne, the primary design challenge was finding a cost-effective feasible system "without going platinum. We had to design good, workable materials. However, we couldn't buy a Cadillac; we had to go with a Buick." Unlike owners on most turnkey jobs, ADC has maintained a high visibility on the jobsite, installing a fulltime jobsite manager, Neal C. Gibbs, Jr.

ADC could not have picked two more pro-gasohol states in which to locate its ethanol plants than Iowa and Nebraska. Iowa is second and Nebraska is seventh in terms of national gasohol consumption. About 35% of all gasoline sold in Iowa is an ethanol blend. In Nebraska, two additional firms have announced tentative plans to locate ethanol facilities, capable of producing about 40 million gallons per year, in the state.

"Our attitude is, the more the merrier," says Todd Sneller, administrator of Nebraska's 13-year-old Gasohol Committee. Yet Sneller's cry of "more" brings shudders to those watching road coffers dwindle because of gasohol tax subsidies, established during last decade's cry for energy independence. Nebraska alone will lose an estimated $12 million this year from the state's five-cent gasohol tax break. That figure is almost double the amount lost in 1983 when revenue losses were a reported $6.8 million.



1983 road revenues lost due to gasohol subsidy*

*Missouri does not have a gasohol tax subsidy

This year, three attempts to rid the state of the gasohol subsidy failed miserably in Nebraska's legislature. Any similar proposal in the near future would probably meet the same fate, admits the Nebraska Department of Roads. "Nebraska is considered the grandfather of gasohol," says a roads department spokesperson. "We have a rural legislature that is sold on it and it's most difficult to do anything about it." "It's kind of ironic that the better job we do in promoting gasohol, the worse it is for highways," says Sneller of the Gasohol Committee. "I feel that we can't sacrifice either."

Iowa, which boasts several ethanol plants with a total capacity of more than 85 million gallons per year, has seen several of the smaller plants cease operations, victims of either competition or mismanagement. While Iowa gasohol consumption reached an all-time peak of 150 million gallons last year, the state is gradually eliminating its gasohol subsidy.

Gasohol has an established market in Iowa—a market that will survive even though the subsidies do not.

Although the gasohol tax break has been decreased two times in the past two years, gasohol consumption actually rose from 499 million to 510 million gallons per year during the same time period. The tax break, originally 7 cents but now down to

3 cents, gradually will be phased out by 1986. Kansas, a relative newcomer to the gasohol business, currently is reexamining the effects of its 5-cent gasohol tax break on road revenues.

Although Secretary of Transportation John Kemp claims that no concrete proposals have been made to reduce or eliminate the gasohol subsidy in next year's legislature, he does admit that he is currently "pointing out what the problem is. We want to have a better handle on what the facts are," he says.

Kansas estimated that it may lose up to $85 million in road revenues during the next five years if the tax breaks aren't halted. With consumption at 67.3 million gallons during 1983, the state is ninth in the nation in terms of gasohol consumption. An interim legislative committee, headed by Kan. Rep. Rex Crowell (R-76th District), will study the subsidy.

Mr. DASCHLE. Thank you, Mr. Doyle, and thank all of the witnesses on this second panel. I appreciate your testimony very much.

I have a couple of questions I'd like to ask. First of all, Mr. Young, I've been a member of AAA and I was interested in your comments in regard to subsidies.

You quote, on page 3, that free market forces, not subsidies, should determine the operation of the energy market. According to this Department of Energy study, the Federal Government has provided more than $55.48 billion in tax incentives to the oil companies; $123.5 billion totally in terms of various kinds of Federal support to the oil industry.

Would you support then the abolition of all support from the Federal Government to the oil industry as well?

Mr. YOUNG. Congressman, my statement stands and it stands with regard to anything, yes.

Mr. DASCHLE. So that you would abolish all subsidies to the oil companies?

Mr. YOUNG. I think business functions far better if the free market prevails.

Mr. DASCHLE. Very good. Let me ask you this. I'm, of course, the sponsor of the federalization of the tax exemption or the credit that we're talking about here—the excise tax exemption. I have suggested that while we increase the exemption to 8 cents simultaneously we would provide $1.8 billion to the highway trust fund by placing a 2-cent increase on the leaded gasoline excise tax.

That would make up the difference. Is your objection to the exemption that I have proposed here, the federalization? Would you still oppose the exemption if we could make up in the difference the additional costs by putting that 2-cent increase on leaded excise tax?

Mr. YOUNG. It seems to me, Congressman, that you're simply taxing motorists another 2 cents, those who use leaded gasoline. So you're taxing them again for a product they are already paying for and being taxed for once.

Mr. DASCHLE. So it isn't just the revenue. It's the increase in tax that you're opposed to in this case?

Mr. YOUNG. Well, it's both, obviously. But to say well, we will tax you some more in order to pay for this subsidy over here, certainly doesn't seem to me to be a solution to the problem.

Mr. DASCHLE. Has AAA ever done a study as to what impact we've had environmentally, the cost to our society, to our country, with regard to the pollution that automobiles currently cause as a result of leaded gasoline?

Mr. YOUNG. I am not aware of what may or may not have been done in terms of that; I know we have very active energy and pollution interests. But I don't have with me anything that I could respond with.

Mr. DASCHLE. Well, if AAA could be shown that with a $225 million investment, which represents one one-thousandth of the total Federal investment in all energy sources, the country saved perhaps something four or five times as great in terms of the environmental costs leaded gasoline is causing, would you then change your mind with regard to that Federal subsidy?

Mr. YOUNG. Congressman, it seems to me that we're trying to mix the problems of leaded gasoline in with another matter here and I don't see them as being as related as apparently you would like to make them.

Mr. DASCHLE. Well, I'm disappointed then, Mr. Young, because I don't see anything more important than phasing out lead as quickly as we can in order to clean up the environment. As I look to the problems that we have in our environment today, one of the most significant is the incredible pollution that anyone who visits some of the larger cities encounters every time they come.

Every EPA study I've seen has shown me that the biggest cause of environmental pollution today has been leaded gasoline. Now, what would you say if EPA convinced you that the biggest cause of the problem was lead, that we could clean up lead by finding an alternative to the incredible pollution we have within the communities today? Would it then be worth it in the national interest, in AAA's opinion, to provide this $225 million in subsidy to a pollution-free industry?

Mr. YOUNG. Let me respond with a question, Congressman. Is it not true that if we instantly or very quickly phase out the use of leaded gasoline, that we're going to be having a tremendous impact on just the people who can least afford it, the poor people that are driving automobiles that are older and still use leaded gasoline. Is not that going to happen?

Mr. DASCHLE. Well, I think you'll find that ethanol can be very easily substituted. I happen to have one of those cars. I've got a Pontiac that has 230,000 miles on it that burns ethanol-blended gasoline very well. I would think that, given the fact that somebody earlier reported that with every 12,000 gallons of ethanol we create one new job, if I were a poor person looking for work, that would be a mighty fine statistic for me.

So I would hope that not only would we create a clean environment but that we might be able to create the jobs that this promises. I would hope that AAA would take a good look at the potential opportunities for growth, and especially the opportunities for a cleaner environment, and come to the realization that alcohol fuel is a tremendous contribution to that effort.

Lee, I was very pleased with your testimony. In particular, I was interested in knowing if you could give me an analysis of what it would have done last year—instead of putting aside 80 million acres as we did under PIK—if we could have used that 80 million acres to produce wheat and corn at a profit for sale to the energy industry.

Could you just hypothesize for a minute as to what that might do to a farmer in South Dakota?

Mr. SWENSON. Well, anytime you can, No. 1, be able to get a farmer to produce on the land that he owns and be able to make a profit, and spend that money in the local community, and provide jobs in local communities and help have business be a lot more profitable.

But, on top of that, I guess, it goes to the statement that was made in the first panel, I think, really hit the nail on the head. When he said, export for just the sake of exporting and not worry about what you're getting is just stupidity. And I think that that's the type of leadership that's been shown in the area of trying to solve the problem in agriculture, and not look at what could be done in the area of alcohol fuels in our own domestic use.

And then to provide a domestic farm program provides stability and an economic base for agriculture, rather than, you know, living under the panacea of export.

So I just think we're totally misdirected and I think alcohol fuels is just a perfect place for the development of domestic use of our own production.

Mr. DASCHLE. Thank you, very much. I want to thank the whole panel for an excellent presentation and I turn the questioning over now to Congressman Jacobs.

Mr. JACOBS. I have two questions of either Mr. Doyle or Mr. Young. The first question, I guess, is for Mr. Young. What percent of the American fleet of private automobiles now is old enough still to use the leaded gasoline?

Mr. YOUNG. Off the top of my head, I don't know the answer to that. I believe the average age of the automobile on the road today is about 6½ years and it's increasing. So there is——

Mr. JACOBS. Increasing you say?

Mr. YOUNG. Your average age of a car——

Mr. JACOBS. Even with the record sale of new automobiles?

Mr. YOUNG. Well, that's probably going to turn around and begin to go the other way with the improvement——

Mr. JACOBS. I just wondered, how far out into the future the point is up for diesel and the leaded gas would be valid? I suppose there are a few who persevere, such as Tom?

Mr. YOUNG. I don't know what year Congressman——

Mr. JACOBS. It's just possible that——

Mr. YOUNG. 1974 was about the break point, as I recall. So there are some 10 and 12 and 14-year-old cars around yet. Obviously that number is going to decline, yes.

Mr. JACOBS. Sure, well maybe Mr. Doyle will have an opinion on it.

Mr. YOUNG. If the subsidies were stopped today, what percent of the industry do you suppose would go out of business?

Mr. DOYLE. Of the gasohol industry?

Mr. JACOBS. Yes.

Mr. DOYLE. I have no feel for that, Congressman.

Mr. JACOBS. Mr. Young, would you have any notion about that?

Mr. YOUNG. No, I don't have any notion about it.

Mr. JACOBS. You don't see what appears to be an immediate abolition do you?

Mr. YOUNG. No, phase out, phase out. There's a radio station in South Dakota, WNAX that, over 60 years ago used to sell alcohol blended gasoline through their service stations and sold it very well. There was no tax subsidy, there was no nothing.

Mr. DOYLE. Congressman, if I may, I do not advocate the discontinuance of funding for the development of ethanol blended gasoline. I just think that it is a short-sighted view to rely so heavily, and I apologize Congressman Daschle, but I think we're heading for trouble if we rely so heavily on the excise tax.

I would prefer to see it funded out of general revenues rather than to piggyback on the gasoline tax excise tax exemption. I would support that.

Mr. JACOBS. Of course, we have no deficit in the trust fund. We do in the fund that you just referred to.

Mr. DOYLE. It depends and of course that is the reason sometimes that we get into the, you know, multiple budget type of manipulations and we never draw down on the balance in the trust fund either in order to have the offsets available to us, so that we look good. But when you're doing business with yourself, internally or in Washington, you know, who's kidding who really?

Mr. JACOBS. Thank you very much.

Mr. DORGAN. Thank the panel very much for the testimony that you've given us and again, we will make your complete testimony a permanent part of the record.

Thank you very much.

The next panel that we're going to ask to come forward today is Mr. James Wilkins, manager, State Relations, Marathon Oil Co;

Mr. John Ross, director of tax compliance, Ashland Oil;

Mr. Roger Davis, project manager, Johnson Bros. Corp., Minneapolis;

Mr. Robert Schwandt, vice president and general manager, ethanol division from A.E. Staley;

And Kathleen Graf, Graf Feed & Fuel Ethanol Co., Waterton, MN.

If you would please come forward, we would appreciate it.

Let me again say that we will include your entire statement as a part of the permanent record, and would ask you to summarize.

We would like to call on Mr. James Wilkins. Mr. Wilkins.

STATEMENT OF JAMES A. WILKINS, MANAGER, STATE RELATIONS, MARATHON OIL CO., FINDLAY, OH

Mr. WILKINS. Thank you, Mr. Chairman. I appreciate the opportunity to be here today, although my testimony will probably sound as somewhat of a voice in the wilderness. I am here in the interest of fully discussing this issue and I will bring out the points of view that Marathon has.

Marathon Oil Co. is not well known in South Dakota. We are a regional company owned by United States Steel Corp.

We do sell 3.7 billions of gasoline a year, 65 percent of that to independent businessmen, primarily in the Great Lakes States of Indiana, Ohio, Illinois, Wisconsin, Michigan, and the Southeast. We do not, by choice, blend alcohol in any of our gasoline. Marathon's marketing policy notwithstanding, I wish to state for record, that

Marathon is in no way, shape or form against alcohol per se, provided the alcohol-gasoline blend is clearly labeled as to what's in the product, and the label is prominently displayed on the gasoline pump.

Marathon does believe that ethanol is oversubsidized today. For example, in the State of Illinois, effective the first of the year 1985, ethanol will receive a total of $1 per gallon in governmental subsidies. If ethanol is priced at $1.50 per gallon, this means that the subsidy is 66 percent of the price of the alcohol, and that is a very healthy subsidy in our opinion.

Governmental alcohol subsidies do have certain broad policy implications which I would briefly outline.

Government subsidies, combined, have now made ethanol cheaper than gasoline. In fact, they have made it cheaper than methanol which must be mixed with expensive cosolvents. The resulting effect—govenmental policy is choosing ethanol as the preferred alternative fuel at the expense of gasoline and other alternate fuels.

Another thought that Marathon would bring forth is that, in addition to the $225 or so million per year that the Federal highway trust fund is deprived of due to Federal alcohol subsidies, an additional $150 million is drained from the States through their own alcohol subsidy programs. These estimates are based on 1983 market shares. With the Federal increase coming, certainly market shares and costs will increase. These losses in highway funds will, indeed, disadvantage many consumers because alcohol use does not pay for the highway system given the present subsidy structure. I think another interesting number is, if Marathon Oil Co. went into ethanol, which we have investigated, we would have to make substantial capital investments and we would use or require somewhere around 200 to 400 million gallons of ethanol a year, which is 80 to 90 percent of the entire domestic production. I doubt that we would be able to secure that much domestic ethanol and yet, because we are not able to secure it, we are forced to compete against competitors with alcohol who are being paid by various governments to be more profitable than companies that do not use alcohol.

Marathon believes, and I think this is an important point to make, the subsidy on ethanol, as it is now granted, will have to inevitably increase over time. I think this theory is evidence by the two 1-cent increases granted by Congress in the last 2 years.

On the production side of ethanol, the costs appear most significantly tied to the price of corn. If corn prices go up, then the price of ethanol will have to go up. If the price of corn does not go up, then the logic of this being a farm incentive program does not work.

Now, on the selling side of ethanol, the market price of ethanol is tied to the price of gasoline. In the last 1½ years, gasoline has gone down a total of approximately 17 cents a gallon. So, as ethanol production costs rise because of increasing corn prices and the cost/price spread widens between corn and gasoline, the subsidy for ethanol will have to be increased.

There is an additional point of clarification needed here; Marathon has not opposed subsidies paid directly to producers of alcohol, nor have we been against subsidies paid directly to farmers which would enable the production of ethanol at a price equal to gasoline. What we do object to is the present subsidy going to certain of our competitors, who as a result of the subsidy can mix ethanol with gasoline and obtain a product costing significantly less than "neat" 100 percent gasoline to compete with us. In Indiana, Marathon did not oppose a plan effective next year, to pay a subsidy directly to the producer of alcohol.

In closing, Marathon does not believe that we're looking at a decline in the alcohol subsidy by 1992, but rather that the subsidy will be steadily increasing. The bottom line is, by encouraging greater substitution of an 80- to 85-cent product, gasoline, with a $1.50 product, ethanol, there has got to be an increase in costs.

[The prepared statement follows:]

STATEMENT OF JAMES A. WILKINS, MANAGER, STATE RELATIONS, MARATHON OIL CO., FINDLAY, OH

I am James A. Wilkins, Manager of State Relations, Marathon Oil Company. I appreciate this opportunity to be invited before the Subcommittee and express Marathon's views regarding alcohol subsidies. I ask that my entire statement be included as part of the report of this proceeding. I will summarize our views in the interest of time.

Marathon engages in the producing, refining, marketing and transportation of petroleum and petroleum products in the United States and abroad. We are owned by United States Steel Corporation.

Marathon markets primarily in six Great Lakes states and in the southeastern region of the country. Over the years a very significant portion of marathon's gasoline has been sold to independent marketers who resell the product under their own private brand names and to independent dealers, jobbers and distributors who resell the product under the Marathon trademark.

In 1983 we sold about 3.7 billion gallons of gasoline, and more than 68 percent of our sales were made to those independent businessmen. That group includes approximately 2,200 Marathon branded outlets in Indiana, Illinois, Kentucky, Ohio, Michigan and Wisconsin which are operated by independent marketers primarily as full-service stations.

The remaining 32 percent of our gasoline in 1983 was sold through a wholly-owned subsidiary engaged in direct retailing under our secondary brand names.

Though we do not blend either ethanol or methanol into our gasoline, we want to make one point very strongly—Marathon Oil Company is not against alcohol per se. We have no objection to any competitor selling alcohol-blended motor fuel—as long as the consumer is fully informed about the product's contents via a conspicuously placed label at the point of sale.

The issue under discussion today is the tax subsidies that the United States grants to alcohol fuels. Effective January 1, 1985, a 6¢ per gallon excise tax exemption will be granted for 10 percent alcohol fuel mixtures. Also a 60¢ per gallon producer tax credit for alcohol will be available. The allowable amount of excise tax exemptions for alcohol mixtures is reduced in proportion to any tax credits received by the producer of the alcohol. Presently the majority of tax exemptions are taken on alcohol fuel mixtures. The tax incentive focuses on the marketing of alcohol fuel mixtures rather than the production of alcohol. In addition to federal alcohol incentive programs, states provide an average 4¢ per gallon tax exemption for 10% alcohol fuel mixtures (e.g., Illinois 4¢; Nebraska 5¢; Kansas 5¢; New Mexico 11¢; Iowa 3¢).

Marathon's main concern about alcohol fuels is the tax subsidies given ethanol by federal and state governments. These subsidies combine to amount to more than $1.00 per gallon of alcohol in some states. Stated differently, ethanol, which sells for about $1.50 per gallon, can receive a subsidy worth 66 percent of its price.

These figures have the following impacts on the gasoline market:

1. Governments are subsidizing our competitors so generously that ethanol is priced lower than gasoline!

2. Because the subsidy cost is borned by the Federal Highway Trust Fund, approximately $250 million will not be available for desperately needed highway and bridge repairs and maintenance. This estimate is based on 1983 ethanol sales at a 6¢

federal subsidy level which will undoubtedly cause further sales increases above 1983 levels.

3. We believe that strong evidence exists which proves that ethanol was over subsidized even before the recent increase that Congress instated. In 1983 alcohol-gasoline blend sales increased 89.6 percent over 1982 sales in the 17 States comprising the bulk of U.S. sales volume according to DOT's FHA data. These 17 states had sales of 3.6 billion gallons of alcohol-gasoline in 1983 and 1.9 billion gallons in 1982. Alcohol-gasoline market share in the 11 volume leading states representing 80 percent of all alcohol-gasoline sales, averaged 7.87 percent in December 1983. On a national basis, alcohol-gasoline blend sales accounted for at least 3.5 percent of total U.S. gasoline sales.

4. Marathon believes that the subsidy will have to constantly increase in order to maintain its purpose. The cost of producing alcohol is tied to the price of corn. If ethanol production is a factor in increasing the price of corn, then the cost of ethanol will move upward. If it does not increase the price of corn, then the logic of the subsidy being a benefit for farmers is not valid.

On the selling side, the price of ethanol is sensitive to the price of gasoline. Gasoline prices have experienced downward pressure since early 1983 (about 17 cents per gallon)—and still the worldwide surplus of crude oil continues. Unless gasoline prices rise dramatically—or the price of corn falls—recipients of the tax subsidy will be in a position to regularly seek increased relief. Evidence: two one-cent increases by Congress in the past two years.

In summary, Marathon believes the following factors point toward the need for constantly increasing subsidies:

1. The incentive discriminates in favor of one particular fuel—ethanol—and retards development of energy alternatives that may be more viable and less costly (e.g., methanol).

2. At a minimum, the social cost of producing ethanol is the difference in value between the cost of ethanol (approximately $1.60 per gallon) and the cost of gasoline (approximately 85¢ per gallon) which the ethanol would replace. In our opinion, that raises a very significant question.

As stated in the recent GAO Report entitled "Importance and Impact of Federal Alcohol Fuel Tax Incentives":

"It is not possible with currently available quantitative tools to precisely predict the net impact of ethanol production on the U.S. economy. Conventional economic theory suggests that national economic welfare will be reduced when a higher cost product is substituted for a lower cost product that provides the same service. Since gasoline costs about one-half as much as ethanol and is as good an automotive fuel, the theory suggests that on strictly economic grounds ethanol should not be substituted. To do otherwise will reduce overall economic efficiency and thereby most likely lead to a contraction in output rather than economic expansion."

3. Grain ethanol production costs continue to outstrip current gasoline prices and ethanol as a transportation fuel is thus uneconomic.

4. Existing refining output would be altered and replaced with approximately half as much alcohol production capacity. A large scale ethanol program designed to displace a portion of the gasoline pool would lower refinery runs and force the importation of middle distillate products.

5. There is no conclusive evidence that the substitution of grain ethanol for gasoline is more energy efficient.

6. The GAO Report "Importance and Impact of Federal Alcohol Fuel Tax Incentives" in its conclusions and observations section states:

"We do not believe . . . that the benefits provided the nation by the fuel ethanol industry warrant an increase in the incentives beyond that already available. The contributions made by the ethanol industry are now limited and are likely to remain so in the future. Further, combined federal and state subsidies are sufficient to make ethanol competitive."

Interestingly, while these legislative questions have yet to be answered, Congress continues to adopt policies that are forcing the emergence of an industry that may never be economically viable or necessary. Worse yet, investors, employees and customers of that industry could be destined to face intermediate range problems that will be difficult for government to back away from.

Thank you for your attention.

Mr. DORGAN. Mr. Wilkins, thank you very much for a slightly different perspective on an important issue.

John Ross, I believe, has left. Who is representing Ashland Oil?

STATEMENT OF JAMES G. BOOTEN, MANAGER, PROPERTY AND EXCISE TAXES, ASHLAND OIL, INC.

Mr. BOOTEN. My name is Gary Booten. I am manager of the property and excise tax group for Ashland Oil. Mr. Ross was called away.

I am here representing Ashland, who is a 50-percent partner in a joint venture at a Southport ethanol plant. The plant has an annual capacity of approximately 60 million gallons of ethanol and consumes 24 million bushels of corn.

Our sales at Ashland currently are running around 200 million gallons of gasohol which equates to about a $6 million annual tax credit.

What I am here today to do is hopefully relay to you a current problem that we are having, and that we feel will be a problem in the future concerning the administration of the alcohol credit, particularly the excise tax.

There are two incentives presently available, the 5-cent-a-gallon excise tax exemption and the 50-cent-a-gallon alcohol credit on the income tax. The problem we are running up against on the excise tax exemption, which is the most used method, is this 10-percent blend concentrate.

The IRS is taking the position that this 10 percent must be proven at the time of sale, which means that each sale at the pump must be 10 percent. From an administrative standpoint, this is practically impossible to prove.

That is it in a nutshell.

The IRS also require the blend to be proven on a temperature adjusted basis, which, again, from an administrative standpoint, is almost impossible.

The alternative is a 50-cent-a-gallon income tax credit for each gallon of alcohol blended. The credit is applied against your income tax liability. This method has some merit. However, for companies that find themselves in a position where they are not paying any income tax, this puts them at a competitive disadvantage.

What we would like to see is an alternative method of either a 50-cent-a-gallon credit for the amount of alcohol gallons actually blended against your excise tax, or make the income tax a refundable credit.

What you would be doing is saying that the Congress is interested and concerned about the future of this program. You would not effect the revenue but would promote the blending of alcohol by making it easier for the blender to receive the credit that Congress intended.

Thank you.

[The prepared statement follows:]

STATEMENT OF JAMES G. BOOTEN, MANAGER, PROPERTY AND EXCISE TAXES, ASHLAND OIL, INC.

Ashland Oil, Inc. is a fifty-percent participant in a joint venture in South Point, Ohio, which produces ethanol to blend with gasoline for the marketing of gasohol. The plant has a capacity of 60 million gallons per year. To maintain capacity requires an annual purchase of 24 million bushels of corn.

Recent figures indicate that Ashland is currently marketing about 200 million gallons of gasohol annually. Approximately sixty-five percent of this volume constitutes taxable sales, while thirty-five percent is sold to other licensed distributors.

The annual credit utilized by Ashland, attributable to sales of gasohol, exceeds $6 million.

At present there are two means available for taking the allowable gasohol credit. One method is to take a credit of five cents per gallon of gasohol sold. This method requires a precise gasohol blend of 90% gasoline, 10% alcohol, measured on a temperature-adjusted basis. For blends of differing ratios, the taxpayer may take a credit of fifty cents per gallon of alcohol blended and sold in gasohol against its income tax liability for that year.

We have found that problems exist with both of these methods. Our testimony today deals with these problems and proposes an alternative which we feel would simplify the process for determining the alcohol tax credit for both the Internal Revenue Service and the taxpayer.

The problems involved with the five-cent per gallon credit may be categorized as follows:

(1) Proving the 10% blend.—To qualify for the reduced excise tax, a blender must show proof that the blend contains precisely 10% alcohol. The Internal Revenue Service is intepreting this in its strictest sense. The Revenue Service perceives the law to require that the blend be proven at the time of sale, which translates into the blender having to prove the 90%-10% blend at the time the gasohol is delivered into the tank of a motor vehicle. Since the point where the blending normally occurs is frequently well up the distribution line from the point where the retail sale occurs, there may be instances when an exact 90%-10% blend is not present. This may happen even though the product met the test at the point of blending.

(2) Method of calculation.—The Revenue Service is insisting that the blend be temperature adjusted, which means that both alcohol and gasoline gallons must be calculated on a net basis. This is not appropriate in all cases and requires special handling by the blender. Many purchasers of long standing require billing on a gross basis. In these instances duplicate record keeping will be required.

(3) Unnecessary record keeping.—Elaborate bookkeeping and accounting procedures must be implemented to trace and maintain documentation to prove the 10% blend. This is above and beyond our normal record keeping requirements. Also requirements placed on Revenue Service auditing procedures are more demanding.

The problems we find with the income tax credit are:

(1) Limited income tax liability.—If a blender finds himself in a position where he does not generate sufficient income tax liability, he may lose all or part of the tax benefit since the credit is nonrefundable. The credit may be carried forward, but loss of the use of money puts him at an unfair disadvantage with his competition.

(2) Highway trust fund versus general fund.—We do not know whether this is a genuine concern, but it appears inappropriate for a tax credit for highway fund monies to be applied against the general fund. This will occur, however, when companies are required to take the excise tax credit against their income tax liability. The highway fund is thereby increased at the expense of the general fund.

It is apparent that the alcohol credit has been provided as an incentive to the sale of gasohol. We contend that the available methods for taking the credit in many cases are frustrating this incentive.

The procedure for taking the excise tax credit based upon a 90%-10% blend, also presents a frustrating situation for the Revenue Service. Auditing to determine that a precise 90%-10% blend ratio is present in each gasohol sale will be time consuming and nonproductive. It will be nonproductive since the excise tax credit that is disallowed for failure to meet the blend requirements would be transformed into a credit on the income tax return for alcohol blended. Rather than having a concern for the blend ratio, the Revenue Service should be allowed to devote audit time to determining, solely, whether the correct amount of credit was taken by the blender.

The solution to these problems, we think, would be to authorize a credit based upon the amount of qualified alcohol blended into gasohol to be applied as a credit against the motor fuel excise tax liability of the blender. This procedure would accomplish the following:

(1) Simplify the audit procedure for the IRS;

(2) Simplify verification procedures for the taxpayer;

(3) Provide current tax credit for all taxpayers; and

(4) Avoid the application of a road fund tax credit against a general fund tax liability.

We do not propose this provision in lieu of the credit provisions now available, but as an alternative method. Other companies may find the presently existing credit computation method perfectly suited to their operations. We do not, however, and it is in this context that we ask you to give our proposal due consideration. We are confident that many other companies are in a situation similar to Ashland's in regard to the problems we have identified; however, some of them may not now recognize it.

As an aside, we should mention that Kentucky and Ohio, states in which we have sizable marketing activities, both utilize this method for providing alcohol credits. We, therefore, have practical demonstrations that this system will work and work well.

A second alternative, which we would propose should our first proposal not be acceptable, would be to make the alcohol credit on the income tax return a refundable credit. We do not consider this recommendation as satisfactory as the first, but it would solve the blender's problem of potentially losing the benefit of the credit should the income tax liability not be sufficient to fully cover the alcohol credit.

We thank you for the opportunity to present our testimony and appreciate your attention. If you have any questions, we will make every effort to answer them.

Mr. DORGAN. Thank you very much for your testimony. Next, we'll hear from Roger Davis, project manager from Johnson Brothers Corp. from Minneapolis. Mr. Davis.

STATEMENT OF ROGER DAVIS, PROJECT MANAGER, MINNESOTA ALCOHOL PRODUCERS [MAP], JOHNSON BROS. CORP.

Mr. DAVIS. Members of the committee, thank you very much for this opportunity to bring my thoughts to you.

I'm project manager for the Minnesota Alcohol Producers project, which is one of the original seven loan guarantee projects granted by the Department of Energy way back in 1980.

Our plant has not been built yet, and you might be wondering why. I think my testimony will bring to your attention some facets of tax law which affect the ability of companies to build these facilities. Here we have a project which is a 20-million-gallon facility awarded in a competitive situation to be built at Mankato, MN, and, theoretically, we should have been under construction years ago.

MAP was originally selected in competition in September 1980, and issued a conditional commitment in August 1981, almost 1 year later. It took the Department of Energy that long to be able to gear up—which is I suppose par for the course but was a little bit difficult to understand at the time.

In the meantime, the various partners in the project were incurring substantial front-end development costs. We to date have incurred on the order of approximately $2.5 million in front-end costs and are not yet in a closing cycle.

Let me emphasize here that our corporation, the partnership that we have formed with the farm group, and our other partners in the project very much believe in ethanol. As a corporation, Johnson Brothers, in 1973, reacted to the oil embargo by saying that they would like to move into the energy field and thought it was good for the Nation to move in the direction of energy self-dependency.

We concentrated our efforts first in coal and we were shortly one of the largest builders of coal-handling facilities in the United States. We have mined coal, we've shipped coal, we've built major terminals to handle coal, and we are part owners of coal terminals. We also moved in the direction of other energy-related elements of our national economy, with ethanol being one of those areas on our front burner.

The delay following award of conditional commitments by DOE really hurt; that was one year. The administration then tried again and again to eliminate the program after we had already been awarded. I cannot begin to tell you how the on-again-off-again threat on the conditionally awarded loan guarantee and the series of threats against the gasoline tax exemptions hurt us. They eventually caused Minnegasco, Minnesota Gas Co., our partners in the project, to pull out and walk away from the project in February 1982. They specifically cited as their reasons, both publicly and privately, the fact that this was the third time that the tax exemptions and the whole concept of loan guarantees for a beginning industry had been challenged, and they simply could not afford to stay with the project when it looked like we were forcing at least an additional 1-year delay again.

A second major problem has been two major overhauls of the Tax Code since 1980. These have caused investor types to look at this type of project and be nervous to say the least. The 1980 and the 1982 overhauls of the Tax Code caused the investors and their advisers to need reeducation time as to how the mechanics worked in complicated financing.

When we were selected as the second project by E.F. Hutton to form a limited partnership much like our sister project at Indiana, New Energy, I personally was the contact with the Hutton salesmen all over the country as they began selling the issues. I cannot begin to tell you the frustration these people were having in grasping the nature of the tax law as it related to this particular type of investment and the changes. The investors were having a great deal of difficulty understanding ethanol tax law. This was further complicated severely by a PIK program going on exactly the same time—and a drought.

The third major problem that we were having was the problem of the EITC interpretation—the energy investment tax credits. Nobody could give us a straight answer and tell us whether or not the energy investment tax credit applied to ethanol, and when I say "nobody" we were dealing with some of the major law firms in the country.

Hutton's lawyers, our lawyers, a total of five law firms, were in disagreement. Two said that the energy investment tax credits were gone—as of December 31, 1985. Two said they weren't gone. One firm said that the taxpayer had a choice. That's the kind of opinions we got for over $600,000 worth of legal fees from major firms trying to sort out the EITC tax situation.

In October 1983, we sought clarification from the Treasury directly. We asked our Senator, who's been very cooperative, Senator Dave Durenberger, to work with us to try to get a ruling, or initially just a clarification from Treasury. On October 7, 1983, Durenberger formally requested from the Treasury their cooperation in the matter.

He did not receive a correspondence back on the matter until March 1984. That correspondence was rather favorable and caused us to immediately ask for—and I gather we're going to receive yet this month—a formal ruling from the IRS on this matter of energy ITC's as they relate to ethanol.

The tragedy is that we're 4 years in and here we are seeking clarification on acts of Congress that occurred back in 1978 and 1979. In the meantime, we've lost Hutton, clarification language introduced in both Houses and Senate failed to pass, and the investors became too nervous to face the potential of recapture by the IRS.

What I barely mentioned is that we went through periods over the past 4 years of wild interest rate fluctuations, a general stabilization in gas prices which, hopefully, will continue, and a Payment-in-Kind Program that caused many investors to believe that corn prices would be $6 a bushel by Christmas 1983 and $8 a bushel by 1984.

Even some of the Hutton salesmen believed that.

My conclusion and advice to you as you deal with legislative matters pertaining to ethanol are: One, when you pass a program, particularly one that involves major construction and financing of projects, give it plenty of time and don't tinker and threaten it every time you gather in Washington. It raises pure hell with debt suppliers and equity investors. They don't know what's going on and they're scared. When they're scared, they sit. And I'm talking about major banks, too. I'm not talking about small banks—it takes major banks to work in large dollar projects.

Two, take a look at direct subsidy to producers of ethanol. The tax system that was alluded to a few moments ago by one of my colleagues might work bitter. The tax system for blending may not be the best way to offer an incentive to this industry. I think that a direct payment to the producers might very well be something that is worth taking a hard look at.

Three, make sure the legislation is written clearly enough as to intent that the lawyers and accountants don't take a year—and in our case over $500,000—to come up with a mixed opinion as to which law applies or what they think the law says. The plant at Mankato would be nearly completed today had the issue on the EITC expiration date between biomass and alternative energy projects not been in apparent conflict.

Four, when you have a conflict in the laws of this land, you—Congress—have an obligation to pass clarifying language post haste. Why should we, as citizens and corporations attempting to put projects together, be obliged to seek rulings and encounter huge legal fees, delays, and maybe even go to court to try to understand what the intent of Congress was?

Delays in this day of a changing Tax Code and fluctuating interest rates destroy not only the individual projects but they completely thwart the express will of the Congress.

Five, adequately staff the agencies charged with administering the programs. We have, through our congressional representatives and through direct contact fought to keep people in the Department of Energy that were familiar with the project.

Mr. DORGAN. Mr. Johnson, I don't know whether this is a message to you or not [singing coming from meeting next door] but—we've had some singing going on in the other room so we'll have to be a little tolerant of that I guess.

Mr. JACOBS. I think it makes his delivery all the more patriotic.

Mr. DAVIS. When they break out with "Glory, Glory Hallelujah," that's when I'm going to stop. And I'm just about there. And it's Mr. Davis—I work for Johnson Bros.

Mr. DORGAN. I'm sorry, Mr. Davis.

Mr. DAVIS. We have personally fought, and I might say used our

Senators' offices to fight for the maintenance of people within the Department of Energy Office of Alcohol Fuel so that they wouldn't be RIF'd, so they wouldn't be moved on; we've got to have continuity of staff on projects as complicated as these where the Government is involved if we're going to be successful.

I doubt that the staff levels and expertise that today exist within the Office of Alcohol Fuels are sufficient so that if we were to call up and, say, this morning, we'd like to close in 90 days, I doubt that we'd be able to close in that timespan.

I want to thank you for this opportunity to chat with you and look forward to what comes of this. Thank you very much.

[The prepared statement follows:]

Statement of Roger Davis, Project Manager, Minnesota Alcohol Producers [MAP], Johnson Bros. Corp.

FINANCIAL HISTORY OF PROJECT—BRIEF

1. MAP was originally selected by DOE in competition in Sept. of 1980 and issued a conditional commitment on Aug. 22, 1981.
2. We have incurred on the order of 2.5 million in costs from award to date and at the present time are not in a closing cycle.

WHAT HAS PLAGUED THE PROJECT

1. The delay from Awarded to Conditional Commitment by D.O.E. really hurt (one year). The Administration tried again and again to eliminate the program after it has been awarded. The on-again, off-again threats on the loan guarantee and the series of threats against the exemptions from the federal gasoline tax finally eventually caused our partner, the Minnesota Gas Company (Minnegasco) to walk away in Feb. of 1982.
2. Two major overhauls of the tax codes caused limited partnership type investors to be nervous about the project and just took them time to educate their investors. E.F. Hutton took our project in Aug. of 1982 until Aug. of 1983 to put together a private placement memo for $17.2 million in equity and then could not complete the sale due to the confusion over deadline on the expiration of the Energy Investment Tax Credit (EITC). Two law firms thought EITC's for ethanol plants would expire on Dec. 31, 1985 because of a letter ruling unrelated to ethanol of the IRS in Dec. of 1982 that said ethanol was Biomass. Two other law firms insisted that it was under alternative fuels and as such, the credits would not expire until Dec. 31, 1990. The fifth law firms said that we qualified for either and hence could choose. In Oct. of 1983, we sought clarification from Treasury and have been advised that a ruling is forth coming in July of 1984—this month. In the meantime, we lost Hutton, clarification language introduced in both the House and Senate failed to pass and investors were too nervous to take the risk and face the potential of recapture by the IRS.
3. What I have not mentioned as a factor over the past four years of effort—negative—has been the wild interest rate fluctuations, a general stabilization of gasoline prices and the Payment-In-Kind (PIK) program. The latter caused investors that don't understand corn market to panic—$6.00 corn by Christmas of 1983—$8 by 1985.

CONCLUSION AND ADVISE

1. When you pass a program, particularly one that involves major construction and financing, give it plenty of time and don't tinker with or threaten it every time you gather in Washington. It raises pure hell with debt suppliers and equity investors.
2. Make sure the legislative is written clearly enough as to intent that the lawyers and accountants don't take a year (and $500,000) to come up with a mixed opinion as to which law applies or what the law says. The plant at Mankato would be nearly completed today had the issue on EITC expiration date between a Biomass and alternative energy projects not been in apparent conflict.
3. When you have a conflict in the laws of this land, you—Congress—have an obligation to pass clarifying language post haste. Why should we be required to endure years of delay and huge legal fees to seek ruling and maybe go to court over what you intended or didn't intend. Delays in this day of changing tax codes and fluctuat-

ing interest rates destroy not only projects but completely thwart the expressed will of Congress.

4. Adequately staff the agencies charged with administering the programs. We have, through our congressioinal representatives and by direct contact, fought to keep key people in the Dept. of Energy that were familiar with the project. They have been cut, relocated and moved. If we today wanted to close in 90 days, I doubt that the staff levels and expertise exists within the office of alcohol fuels, Dept. of Energy to do so. The people that are there are great to work with, but they are really spread thin.

I thank you for your time.

ADDITIONAL WRITTEN TESTIMONY

On August 22, 1981, Minnesota Acohol Producers, a joint venture of Minnesota Gas Company and Johnson Bros. were awarded a Conditional Commitment from the U.S. Dept. of Energy for a 90% loan guarantee to construct a 20,000,000 gal. per year ethanol plant in Mankato, Minnesota. Authorizing legislation was Title II of the Energy Security Act. P.L. 96-294. The joint venture was one of seven originally selected (later expanded to thirteen).

On February 1, 1982, with loan closing scheduled for the following week, Minnesota Gas Company withdrew from the partnership due to the Reagan administration's budget proposals to eliminate certain energy tax credits. The "on-again, off-again energy policies makes long-range planning difficult and makes it impossible to proceed with projects such as the alcohol plant." The loss of Minnesota Gas Company set the project back 18 months and necessitated a restructuring of the project to a limited partnership greatly dependent on current tax laws and in particular the Energy Investment Tax Credit.

In the Spring of 1983, E. F. Hutton was retained to draft a Private Placement Memorandum and sell limited partnership units to raise a portion of the equity required for the project. Sale of the units commenced on August 22, 1983 but was terminated September 30, 1983 when it became apparent that the units could not be sold prior to a required construction start-up date of October 20, 1983. A construction completion date of not later than December 31, 1985 was necessitated by the mixed legal opinions of five major legal firms retained by the participants on the expiration date of the Energy Investment Tax Credits and on an IRS Advance Revenue Ruling 83-6 (dated 12/23/82 and not based on any of the ethanol projects). Since the construction schedule was then estimated to be 26 months, there could be no extension of the sales period to Hutton by the owners, even though the rate of sales were improving. The agreement with Hutton was reluctantly terminated on Sept. 30, 1983.

Complicating and delaying the sale of units was the then uncertainty of the impact of the PIK program and the drought on long term corn prices. Reasons given by Hutton for the unfavorable sales experience included, among other things, the following:

A. Concern about the price of corn—The Payment-In-Kind Program plus the adverse weather experienced this past season resulted in a very high corn price in the Midwest. This peak in price occurred in September, 1983 in the midst of the sale.

B. Concern about gasoline prices—With the price of gasoline stabilizing, investors felt ethanol may not be able to compete in the marketplace.

The above two concerns were the substantial issues that required additional time to educate the Hutton sales force. Under the then current schedule, there was not enough time to educate and still meet the construction deadline.

With the long term impact of both PIK and the drought now better understood and with the concern for stability in the Middle East again increasing, the issue of the expiration date of the Energy Tax Credits, specifically for the ethanol industry, should be firmly and fully addressed. S. 1939 and H.F. 4078 clarified what we believe was the original intent of Congress—that being to treat the ethanol blending as Alternative Energy with the Energy Investment Tax Credit available to qualified projects to at least Dec. 31, 1990. We fully support S. 1939, Section 3 and H.F. 4078 and believe that passage of this clarification is absolutely essential to the emerging ethanol/gasoline blend industry and to this project specifically. (We would ask that the legislation to clarify once again be introduced and this time passed).

Mr. DORGAN. You've got a great sense of timing. As you exit——

Mr. DAVIS. Are you suggesting they're into politics?

Mr. DORGAN. Thank you very much for your testimony, Mr. Davis.

Next we would call on Mr. Robert Schwandt, vice president and general manager of the Ethanol Division and we'd appreciate the summary of your testimony; we will make the full testimony a part of the record. Mr. Schwandt?

STATEMENT OF W.R. SCHWANDT, VICE PRESIDENT AND GENERAL MANAGER OF ETHANOL DIVISION, A.E. STALEY MANUFACTURING CO., AND CHAIRMAN, RENEWABLE FUELS ASSOCIATION

Mr. Schwandt. Thank you very much Mr. Dorgan, Mr. Daschle, Mr. Jacobs. I will try to just hit three or four of the high points of the testimony which you have in your hands.

In 1979, the United States was dependent upon imports for half of our petroleum requirements. By 1983, this dependency had been reduced to about 34 percent. The downward trend has now been reversed with the improving economy and our recent figures are back to near 40 percent.

The $60 billion which we'll spend for 1984 petroleum imports will be a major contributor toward our growing international trade deficit. Specifically, in the year to date, imports of finished gasoline are at a rate of over 4 billion gallons per year.

As a measure of the potential ethanol fuel market it means that we could expand eight times over where we are now before we displace a single gallon of domestic refinery production. And with respect to Mr. Jacobs' question a little while ago, we're potential 8 billion bushel corn producers and when we are, we have 1½ billion surplus. That's our market potential in terms of our raw material, a billion and a half bushels times 2½ is about 3½ to 4 billion gallons of ethanol per year, which also happens to describe about the same number as our potential market.

We can use that amount without pushing the price of corn above the support level, since we would simply be skimming the surplus off the top.

The past 3 years have set an all time high in oil and gas drilling activities. The rate of over 80,000 wells per year is sustained at an annual cost of about $24 billion. This feverish activity has failed to offset depletion. Production in 1984 is below the 1977–78 average and our proven reserves continue to dwindle. Our shortfall, now slightly over 5 million barrels a day, is expected to increase sharply over the next decade.

The price of crude oil increased from $3 a barrel to $34 a barrel in less than a decade. As world demand expands, and reserves dwindle, oil prices are expected to increase at a rate in excess of overall inflation. In contrast, the cost of grain has decreased in constant dollars over this decade. These long-term trends clearly point to an economically viable fuel ethanol industry.

The impact of ethanol production on the American agricultural economy is becoming more visible even in the short term. Our industry's production is now approaching 500 million gallons a year. We utilize 200 million bushels of corn. This is a quantity roughly equivalent to our exports to Russia with the added advantage of providing a steady 365-day-per-year demand at a domestic value added industry.

When you consider that we have lost over 400 million bushels of export volume to the EEC since 1976, our 200 million consumption assumes an even greater long-term significance. Last year, the Federal Motor Fuels Tax was increased from 4 cents to 9 cents a gallon, bringing in $5 billion in new money.

Subsequently, Congress has increased the gasohol exemption from 4 cents to 6 cents, to become effective in January, for our 4-percent market share. That's $80 million, or a diversion of 1.6 percent of the new money. In other words, Congress has seen fit to devote over 98 percent of new funds to the highways and a token 2 percent to fuel security, yet we continue to hear concern about this diversion.

We, in the RFA, assure you that we understand these concerns and we stand ready to meet with the AAA and any others who would seek resolution of this issue. For example, Congressman Durbin's recent bill 5727, may be the kind of solution that all parties can support.

You have the rest of my prepared testimony. Thank you for the opportunity.

[The prepared statement follows:]

STATEMENT OF W.R. SCHWANDT, VICE PRESIDENT AND GENERAL MANAGER, ETHANOL DIVISION, A.E. STALEY MANUFACTURING CO., AND CHAIRMAN, RENEWABLE FUELS ASSOCIATION

The great oil supply shocks of 1974 and 1979 are no longer matters of public concern. We believe that the current complacency about the so-called oil glut is unjustified.

In 1979, the United States was dependent upon imports for over half of our petroleum requirements. By 1983 this dependency had been reduced to about 34 percent. The tend has now been reversed with the improving economy, and recent figures are near 40 percent. The expected $60 billion bill for 1984 petroleum imports will be a major contributor to our growing international trade deficit.

The past three years have set an all time high in oil and gas drilling activity. A rate of over 80,000 well per year has been sustained at an annual cost of over $24 billion. This feverish activity has failed to offset depletion. Production for 1984 is below the 1977-78 average and our proven reserves continue to dwindle. Thus, our shortfall, now slightly over 5 million barrels per day, is expected to increase sharply over the next decade. Alternative sources of energy must be developed anbd expanded over this period.

The strategic importance of a fuel production system dispersed throughout the heartland of the United States should not be underestimated. In the case of a national emergency, midcontinent refineries will be able to concentrate on increased yields of priority fuels while ethanol provides the octane for motor gasoline.

The price of crude oil increased from $3.00 to $34.00 per barel in less than a decade. As world demand expands, and reserves dwindle, prices will again increase at a rate in excess of overall inflation. Our supplies of renewable sources will be growing, new technology will be reducing costs, and just as the cost of corn has decreased in constant dollars over this period, so will the price of renewable and alternate fuels relative to petroleum. This long-term trend clearly points to an economically viable fuel ethanol industry.

The impact of ethanol production on the American agricultural economy is must more visable, even in the short-term. Our industry capacity is not approaching 500 million gallons per year and will utilize 200 million bushels of corn, a quanity roughly equivalent to our exports to Russia, with the added advantages of steady 365-day per year demand and a domestic value added industry.

There are currently nine plants operating at 20 million gallons per year, or larger. Competition for cost and quality leadership is fierce, and each new plant advances the state-of-the-art. Yields, energy consumption, labor application and by-products recoveries continue to improve.

At one time, beverage alcohol plants consumed more energy than the fuel value of the alcohol produced. Modern distillation plant can go from beer to anhydrous alcohol with a consumption of less than 20,000 BTU's per gallon. Several approaches to continuous fermentation have been successful, resulting in increased yields of ethanol. Research into improved fermentation methods is progressing rapidly in academic, industrial and government laboratories. The next generation of conversion of cellulosics such as wood chips to liquid fuels continues to receive industrial and academic attention, particularly in the Ag schools of the deep south.

Ethanol is the only completely environmentally benign octane enhancer now available. Tests by the EPA shows that ethanol enriched gasoline results in reduced emissions of hydrocarbons, carbon monoxide and nitrogen oxides. The traditional lead-EDB mixture is now recognized as hazardous to health, particularly in large cities where there is evidence of permanent brain damage to children subjected to the lead in automobile fumes. Unleaded gasoline also contains up to 30 percent of aromatic reformates, including benzene, a know carcinogen.

The United States auto fleet has been converting to unleaded gasoline since 1974. The current market share of unleaded gasoline should be close to 70 percent. However, the inadequate antiknock performance of regular unleaded gasoline and the average price differential of 7¢ per gallon has encouraged motorists to violate the law and misfuel unleaded vehicles with leaded gasoline. The low cost availability of ethanol as an octane enhancer reduces the performance incentive to misfuel.

The recent introduction of HR 5727, by Representative Dick Durbin, provides a means to eliminate the financial incentive. This Bill proposes a 2¢ per gallon tax on leaded fuel, an amount sufficient to largely offset the wholesale differential in leaded versus unleaded gasoline prices. With this differential eliminated, there is much less incentive for retail marketers to "loss lead" with leaded regular. This Bill could thus have a significant impact on the unlawful use of leaded fuel for which there is at this time no other feasible enforcement procedure. Further, the revenue generated from this tax could largely eliminate the problems now associated with the 6¢ gasohol exemption from the federal motor fuel tax.

ATTACHMENTS

W. R. Schwandt is Vice President and General Manager of Ethanol at the A. E. Staley Manufacturing Company. His career there has included process development, plant design and operation in wet corn milling, enzyme production and fuel ethanol. He is currently Chairman of the Board of Directors of the Renewable Fuels Association.

TABLE I.—U.S. PRODUCTION AND IMPORTS PETROLEUM

	Domestic crude oil production (MMB/day)	Imports crude and refined products (MMB/day)	Value of imports (in billion)
1973	9.21	6.26	$7
1974	8.77	6.11	25
1975	8.38	6.06	28
1976	8.13	7.31	36
1977	8.75	8.81	47
1978	8.71	8.36	45
1979	8.55	8.46	63
1980	8.60	6.91	83
1981	8.57	6.00	81
1982	8.67	5.04	65
1983	8.68	4.98	55
1984 (E)	8.65	5.50	60

Source.—U.S. Energy Information Administration.

TABLE II.—DOMESTIC DRILLING ACTIVITY AND PROVED RESERVES

Year	Wells drilled (in thousands)	Reserves (billions of barrles)
1971	25	39
1972	27	38
1973	26	36.5

TABLE II.—DOMESTIC DRILLING ACTIVITY AND PROVED RESERVES—Continued

Year	Wells drilled (in thousands)	Reserves (billions of barrles)
1974	32	35.5
1975	38	34
1976	39	33
1977	45	31
1978	47	29.5
1979	50	28
1980	61	27
1981	80	26.5
1982	88	25
1983	79	24.5

Source.—Data from Oil and Gas Journal (A.P.I.)

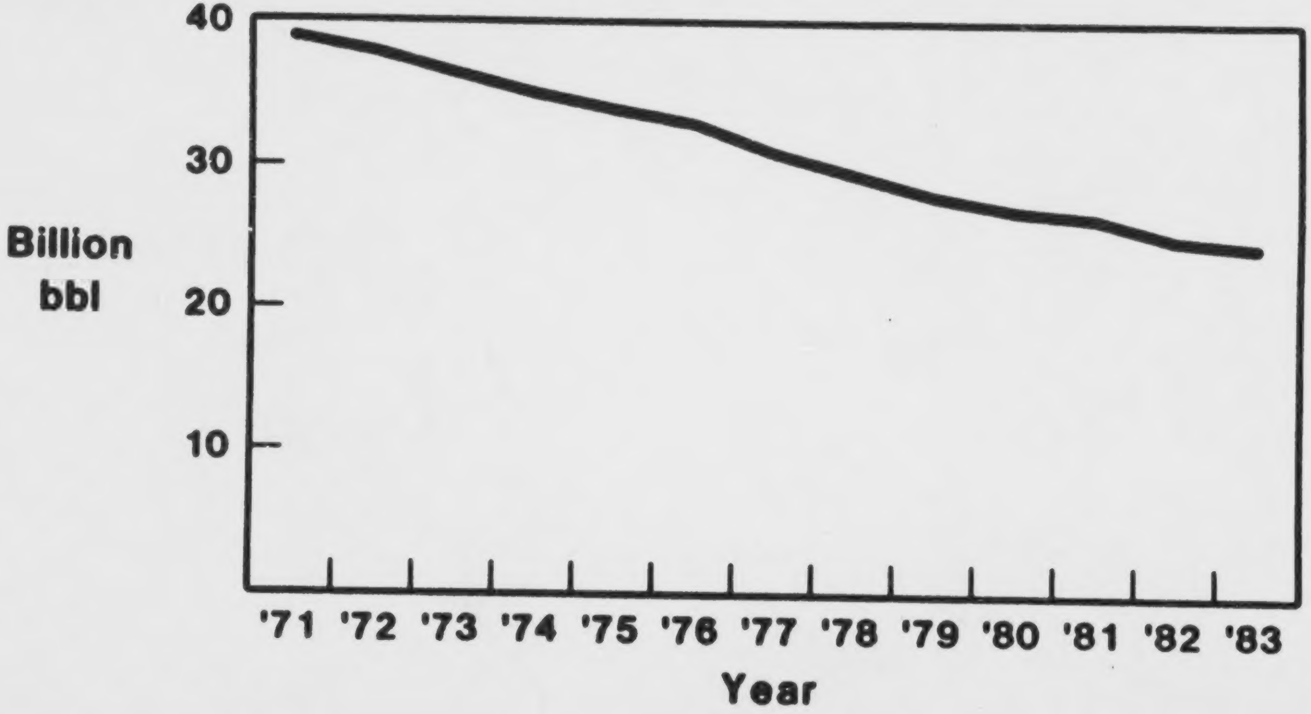
TABLE III.—IMPORTS MOTOR GASOLINE

Thousand barrels per day—Annual Rates—January-June (6 months)

1979	178
1980	147
1981	170
1982	174
1983	220
1984	283

Source.—E.I.A.—Weekly Petroleum Status Report.

DOMESTIC RESERVES



Mr. **Dorgan**. Mr. Schwandt, thank you very much for an excellent statement.

We would next call on Kathleen Graf from Graf Feed and Seed.

Ms. **Graf**. No.

Mr. **Dorgan**. Excuse me. Feed and Fuel Alcohol, all right?

Ms. **Graf**. Fuel Alcohol—we don't have any seed on the premises.

Mr. **Dorgan**. Feed—I'm sorry about that. Congressman Jacobs just said concede. I concede the point. If humor were taxable, that would have been tax exempt.

Kathleen, we would like to hear your testimony and we will include your full testimony as a part of the record.

STATEMENT OF KATHLEEN GRAF, GRAF FEED & FUEL ALCOHOL, WATERTOWN, MN

Ms. **Graf**. Fine. Thank you very much. We wanted to take the opportunity to testify today, and we appreciate that we could be put on at the last minute like this. I say we, meaning my husband and I, even though he's presently not here but we work as a team together.

We have a fuel alcohol plant in Watertown, MN, and there is a Watertown in the State of Minnesota, not only in South Dakota. And the one in Minnesota does have an alcohol plant, and it's pretty much of a case that we just wanted to let you know that the small producer can exist and not be one of the members of the small plants that have gone down. It's such a repeated pattern and something that saddens us terribly to see all the plants going down, and having made it through about a year and a quarter now, we thought it would be interesting and appropriate to let you know what we've been experiencing.

Our plant is categorized at 400,000 gallons a year so that makes it a large on farm, small commercial type size. We produce about 60 gallons an hour and we have an anhydrous system that's a molecular sieve. Currently, we're producing about 1,200 gallons per day and that uses about 480 bushels of distressed or damaged corn, and that is one of the main factors of buying with a small plant. It can be; it doesn't have to be. But we can use the distressed corn; we're providing for our neighboring farmers. One of the virtues of the small plant to farm nature is that we can provide a market for distressed grains right in the immediate area.

We've gotten from the State of Minnesota, and from South Dakota, distressed corn that we can then produce into a very good feed for the cattle in our area. We have about 40 farmers who are feeding our feed product. They're primarily dairy farmers. We sell it at 65 percent moisture; it's been testing out consistently at 30-percent protein and the reaction from the farmers has been very good; they've substituted for soybean meal and they're satisfied with the product.

Our plant is privately owned. There's no investors and its operated as a family business, much as a farming operation would be. Also, we have one employee. The plant requires one person per shift. We do have a child on each shift because of bagging the feed product because it is wet and we make it tied in a plastic bag inside of a feed sack. They pick up—the farmers pick up 60 pound sacks according to how many of them they need.

At the bottom of the page which I've submitted—I'll make it more exact later; I've talked about that I'll be sending more testimony to you—there is an example of our production costs that we experience so that you do have some basis of what a small plant can experience for production costs and to see how we stand in the ranks of things.

Generally speaking, I guess that the value of the small plant is of interest to us in that we do serve the community. We take in the distressed grain from our neighbors and return the feed product back to them for their livestock, and this is pretty much following the theory of what always was supposed to be done by the small plants.

We've managed to do it—it's been a spare year—but we've managed to do it and we're keeping our head above water. It's sort of like the little train that always said "I think I can, I think I can." Well, we're not at the top of the mountain but we're at least not sliding down it.

Some of the problems that we have seen and encountered, talking to other plants also, are the number of charlatans that have been in the fuel alcohol industry, especially for the small plants, I believe, who have come in saying that they know how to put up a plant, and take the peoples' interest and money, and the equipment never worked. That of course damaged the believability of the alcohol industry for quite some time. Also, a lot of plants simply try to go up with poor equipment, that it's imperative for a small plant where it's really a penny business that they have equipment right up on the top that works all the way through.

Nothing is more expensive than down time. The investor stills of the smaller nature have often been operated very poorly because the management is not closely overseeing, and in a small plant you have to be very exact about what you're doing.

Some of the things that we see that are needed besides the tax incentive—we would not be alive today if we did not have a tax incentive on the price of the alcohol. But also the training of producers and personnel, perhaps on a low-tech level, but have this from good authority and from people with experience that they get good training before they go into the alcohol business.

Too many people are going in really quite blind, needing good advice for the spending of Government funds. Just recently, in the folder there was a handout of some Minnesota money to a project that had no chance of making it. Fortunately, it did not go through but it would have been just totally a misallocation of the money funds because the people who were going to head up the funds were not educated about what was required of an alcohol plant.

The tax incentive that is there, we want to see it not too low, but of course not so high that it's an artificial market because we don't need that, have tons of people jumping into it right away.

And, I guess, the final point being to educate the public in general about the difference between methanol and ethanol so they don't get scared so fast when bad things do start happening if it's through methanol—the education of the public is also very necessary.

Well, thank you very much for your time and I appreciate it.

[The prepared statement follows:]

STATEMENT OF KATHLEEN GRAF, GRAF FEED & FUEL ALCOHOL, WATERTOWN, MI

Our family has, as of April 1983, expanded our farming operation to include a fuel alcohol plant. We produce about 60 gallons per hour of very clean 199+ proof alcohol. Our molecular sieve anhydrous system is double capacity, thus enabling us to do custom upgrading of wet alcohol from other plants.

Currently, we are producing about 1,200 gallons per day. We use approximately 480 bushels of distressed or damaged corn which we acquire within the state. The mill, cooking system, distillation system, dehydration and centrifuge are from Germany and are of the most modern technology even by German standards.

The distiller's grain that we produce we sell to our nearby dairy farmers at 65 percent moisture and it has tested out consistently at over 30 percent protein. There are approximately forty farmers currently using the product and the response has been very good.

Our plant is privately owned and is operated as a family business. We have 1 employee, beside our six children who range in age from 5 to 15 years old. There is one adult and one child per shift.

At the bottom of this page is a sample of the figures that we work with to give you an idea of the micro economics of the fuel alcohol industry.

Anyone who is interested in visiting the plant are very welcome. You can contact us at the above telephone number. Also feel free to ask any more questions and we will do our best to answer.

All of us thank you for your time and interest.

Given factors in this example:

Corn price—$3.00 per bushel. Conversion—2.6 gallons per bushel. The distillers grain in this example is dry and sold bulk at $180.00 per ton. (We would have to run full capacity to justify paying $3.00 for corn, but then would have a more difficult time moving all of the grain wet).

Per gallon expense

Gross corn price	$1.15
Corn cost recovered through distiller's grain	.70
Corn cost for alcohol	.45
Labor	.10
Insurance	.10
Energy (oil and electricity)	.35
Enzymes and yeast	.15
Interest, taxes, depreciation	.30
Maintenance and improvements	.05
Total	1.50

Mr. DORGAN. Kathleen, thank you very much for your testimony.

And joining the panel for a final statement, Mr. Robert Thornberg, who's vice president of marketing for Conklin Co., and Mr. Thornberg, we'd appreciate it if you could briefly summarize your statement.

STATEMENT OF ROBERT THORNBERG, MARKETING MANAGER FOR THE ALCOHOL AND FEED PLANT (HARVEST FUEL), THE CONKLIN CO., INC., MINNEAPOLIS, MN

Mr. THORNBERG. Thank you. I will be brief. I appreciate Bob Schwandt offering to pare down some of his time so that I would have a chance to speak. Interestingly our small scale plant, farm scale plant, compared to the one of Bob Schwandt's—A. E. Staley—it would take us about 2 years to do what they do in 1 day. So you can get a contrast of the size. It would mean that we'd need about 700 plants to equal one of the A. E. Staley plants. To give you a matter of scale, it would mean that we'd be able to have a farm scale alcohol plant on every beef operation in the State of South Dakota, and produce the same number of gallons. By putting it directly on the cattle farms that would mean South Dakota alone producing about 63 million gallons annually. That would still leave all of the dairy farms to locate additional plants.

So you can see that, when you discuss small scale facilities, it has some major implications. It was good to hear Kathy Graf talking earlier. We have, in fact, sold alcohol from the farm scale plant that we operate as a demonstration model in Shakopee, MN to their alcohol plant in Watertown, MN, for further upgrading. There is a compatibility of the systems.

The—one thing that I wanted to stress today, and it reinforces, I think, some of the things that we've been hearing, and that is that the crucial need is for financing. We can have a great ability to produce the ethanol but unless there's financing to put the plants online, they simply don't come online.

We've been very gratified to see progress in the farm scale plant to the point now where a leasing company—LeaseAmerica out of Cedar Rapids, IA—has agreed to provide leases in the event that the farm scale plant is situated with a livestock feeding operation. That's a critical point because if you're trying to produce alcohol but do not have the livestock to consume the feed, you can go broke very, very fast. However, if you are feeding livestock you simply put the grain into the alcohol plant first, and then into the livestock. One can enhance the livestock feeding operation.

We talked a little bit about the gallons of ethanol that could be produced on South Dakota beef feedlot operations. If we took the five States that are really affected by this hearing—Minnesota, North Dakota, South Dakota, Iowa and Nebraska—if each of the beef feedlots of over 200 head of cattle and each of the dairies of over 50 milk cows had a farm scale alcohol plant, it would mean the production of 1.3 billion gallons of ethanol. That again is hardly a small-scale type of an operation.

The thing that is most encouraging of all is that we have been able to survive against all the odds. The profitability of the livestock feed related plant is such that it can be profitable now in the opposite condition of where farm alcohol began. There's no energy crisis; fuel supplies are stable; gasoline prices are flat, and when grain prices went up, farm plant operators found, as Kathy Graf had mentioned, that they can still recover full feed value out of damaged grains by processing them in the alcohol plant.

Consequently, the livestock feeders suddenly find that, in addition to new ethanol revenues, they have a new feed-related option which allows them to buy lower priced damaged grain. And in conclusion, I'd like to say that there's no good reason why we can't be able to start putting some of this directly in the hands of the farmers so long as current congressional programs continue to prevail.

It becomes exceedingly important in the next few years to maintain a legislative continuity on domestic ethanol policy. This will allow for not only the establishment of a solid farm ethanol industry, but it will also allow for new fermentation processes to make their way into the marketplace.

Thank you.

[The prepared statement follows:]

STATEMENT OF ROBERT THORNBERG, MARKETING MANAGER FOR THE ALCOHOL AND FEED PLANT (HARVEST FUEL) THE CONKLIN CO., INC., MINNEAPOLIS, MN

I would like to express by appreciation for the opportunity to address this hearing held jointly by the House Agriculture and Ways and Means Committees. It is especially gratifying to testify regarding significant break-through financing developments for farm ethanol since they are made possible by the sound and supportive programs spear-headed in the Agriculture, Appropriations and Ways and Means Committees of Congress.

Just within the past 3 weeks, Leaseamerica of Cedar Rapids, Iowa and Conklin Company of Minneapolis, Minnesota reached agreement on a lease package for Conklin's harvest fuel alcohol and feed plant—a farm scale system for fermentation feed and ethanol production.

The agreement represents an important breakthrough on a new phase for fermentation ethanol in which the farmer benefits more directly than ever before. But not every farmer—primarily it's the livestock farmer who benefits from small scale ethanol plants. Before I elaborate let me step back to review some of the early expectations for fermentation alcohol when it was a blazing panacea for energy woes burning across the countryside in 1979 and 1980.

First it was going to be so easy. Just cook up a little grain in extra barrels. The alcohol could be used right on the farm to replace the gasoline and diesel fuel which would soon top $2/gallon and head for $3. For those who didn't want to bother making their own plant from scrap metal around the barn the manufactured plants would pay for themselves in a matter of months, so financing would be a breeze. But it didn't happen that way, as we discovered.

Like most good things . . . They don't come easily or quickly. Indeed small scale plants have special needs. They require, for example, equal or greater sophistication of equipment and controls to minimize labor requirements.

Equipment improved dramatically over the past four years. A wide new market emerged for wet ethanol to be upgraded for octane enhancement. Critical distillers feed studies initiated in 1980, published in 1982 have now gotten enough circulation and analysis to provide a basis for the type of lease package mentioned earlier.

A primary requirement of the lease company is that the farmer have enough beef cattle or milk cows to consume all of the distillers feed products produced by the plant. Consequently the plant becomes first a feed plant and secondarily an ethanol plant.

Feed studies conducted by the University of Nebraska in 1982 show distillers grains to have 200 percent the protein efficiency of soybean meal for growing ruminants. The wet distillers products outperformed dried products, consequently the cattle feeder has a nutritional advantage with the wet feeds in addition to the savings in fuel and equipment needed if the distillers feeds had to be dried.

Even more simple is the utilization of distillers solubles on a feedlot or dairy. The cattle simply drink them in from the water discharge of the distillation column. Where a large ethanol plant must operate expensive centrifuge equipment to spin out the valuable grain meal solubles and yeast proteins from the discharge water, the livestock producers simply lets his cattle drink this discharge water. University of Minnesota studies published in 1982 showed that cattle gain weight faster on less feed when drinking what we now call sweetwater from the farm scale alcohol plant.

I mention the feed aspect of the plant to make an important point. That is: When properly situated on livestock farms the small scale ethanol plant enhances the feeding program and generates important new revenues . . . financial people who have watched this evolution have begun to respond.

What is most heartening is that profitable farm scale ethanol production is profitable in exactly the opposite conditions of its birth. There's no energy crisis. Fuel supplies are stable and prices are flat. And when grain prices went up, farm plant operators found they could recover full value distillers feeds from certain damaged grains. They suddently had new feed options and in addition to the new ethanol revenues.

Throughout my presentation I have used the term small scale. That may be misleading. Consider this. If every beef feedlot in North Dakota, South Dakota, Iowa, Minnesota and Nebraska simply put 100 bushels of grain through the alcohol plant first and then put it into their animals they would produce 534,311,400 gallons of ethanol to sell. If the dairymen who milk over 50 cows in those same five states did the same thing . . . they would produce 827,120,000 gallons of the fuel. The total is over 1.3-billion gallons of ethanol. Hardly small scale.

There is no good reason why it can't happen if the foresight and wisdom of the current congressional programs continue to prevail as a fledging new phase of the ethanol industry begins to take flight.

It becomes exceedingly important, in the next few years, to maintain a legislative continuity on domestic ethanol policy. This will allow for not only the establishment of a solid farm ethanol industry but it will allow for new fermentation processes to make their way to the marketplace.

Mr. DORGAN. Allright, thank you very much. I would just like to ask one question of Kathleen Graf, if I might.

In your statement, you present I think some very interesting figures for consideration. Is it appropriate for you to give us an analysis of what your investment is over there? I don't think there's anything in here that talks about what size investment you had to make. How did you finance it?

Ms. GRAF. Part of it is financed through the manufacturer and the other part through a local bank but I must add to that it's a local banker who owns his own bank and has no Board to debate the decision with. And our original bank that we were into that we've been with for over 10 years, they handed us their rejection notice, along with an SBA auction for another plant that was going bankrupt, so we were very lucky to find additional financing.

Mr. DORGAN. Could you tell us about what the initial investment is?

Ms. GRAF. About $1.50 per gallon in size.

Mr. DORGAN. I see.

Ms. GRAF. And perhaps I think it's possible to find equipment that would come out less per gallon but the primary bottomline is if that's going to operate continually.

That's what's hurt the small plants so much.

Mr. DORGAN. Alright, thank you very much. Mr. Daschle.

Mr. DASCHLE. Thank you, Mr. Chairman. Kathy, I want to commend you. You've presented an element that we really needed at this hearing and I very much appreciate your testimony.

Ms. GRAF. Thank you.

Mr. DASCHLE. I especially was interested in your recent answers to Congressman Dorgan about $1.50 a gallon. That's substantially below the cost we were told earlier was the cost and I'm delighted to see with efficiency in operation and other kinds of changes, that you can bring down the cost of investing substantially.

Bob, you made a very interesting comment at the end of your statement regarding the percent that we currently spend on highway maintenance as opposed to breaking our dependence on foreign sources of energy. Could you repeat those figures?

Mr. SCHWANDT. Yes; the number I used was the increase of 5 cents per gallon that was effective at the end of 1982, when we went from 4 cents to 9; 5 cents at 100 billion gallons a year generated $5 billion. At that time we increased the exemption for gasohol from 4 cents to 5 cents and we'll go to 6 cents January 1, 1985, so the net increase in the exemption is 2 cents and 2 cents times 4 billion gallons which would be the amount of gasohol sold is $80 million so the ratio is $80 million to $5 billion or 1.6 percent.

Mr. DASCHLE. Those are very impressive figures and I haven't seen that analysis before but I think it really puts this whole issue in perspective—is it worth it to us to pursue an industry at that cost and at that kind of investment level.

Mr. Wilkins, what do you think about that? Obviously, we're going to be phasing out lead. I understand the industry is now 40-percent dependent upon petroleum imports according to testimony presented here. What plans does the oil industry have for the trend that currently exists with regard to our dependency on foreign sources?

Mr. WILKINS. I cannot speak for the industry, Congressman. I can speak for Marathon; Marathon is a very large, domestic producer. We have been successful in finding oil domestically and pride ourselves in doing so. I believe a decline in foreign dependency will continue, primarily through conservation methods. I am not convinced that going to ethanol, even in 100 percent of the market, would settle the question of foreign dependency. Take the consummate theory—let's say we had 10-percent ethanol in every gallon of gasoline. Should this occur, we would have to, according to our estimates, increase the importation of distillates because decreased refining runs due to alcohol substitution would change the production of distillates, asphalts, and so forth. These impacts need to be looked at.

Also, in the short run, we estimate that a maximum shift to alcohol blending would require importing 660,000 barrels a day of ethanol to allow all in the industry to be competitive and to avoid the alcohol-subsidy disadvantage companies like Marathon currently face. So, alcohol importation would be another offset to reduce crude oil imports.

Mr. DASCHLE. You mentioned maintaining the current trend of a decrease in the dependence on foreign sources, I understand the trend right now is an increase and we have now increased our dependency from a point of 34 percent up to 40 percent in spite of 4 or 5 years of real conservation efforts and more-fuel-efficient cars. What I'm concerned about is that the oil companies just don't seem to have the answer and that we continue to talk about breaking that dependency but we simply haven't done it.

What does Marathon intend to do with regard to the phaseout of lead? How are you going to boost your octane level?

Mr. WILKINS. Marathon is currently investigating its options. Realistically, there are four or five options; our friend decision will be based on the economics of each option.

Mr. DASCHLE. Do you agree that ethanol is a pretty good substitute for lead?

Mr. WILKINS. Only if it's subsidized enough.

Mr. DASCHLE. Well, speaking of subsidy, you oppose the subsidy for ethanol. I can understand that you are concerned about the drain on the Federal Treasury. Has Marathon consistently also opposed all subsidies to the oil companies? I understand that subsidy now is $123 billion. Has that been your position on subsidies to oil as well?

Mr. WILKINS. As a general rule, our position is, and has been, to oppose subsidies. I would be less than honest if I said we fought every subsidy we've ever qualified for.

Mr. DASCHLE. How do you differentiate then between $225 million in subsidy to ethanol and roughly $253 billion in subsidies to energy of other kinds?

Mr. WILKINS. One answer I would make to that, Congressman, is one that I think we sometimes overlook. No. 1, there's a windfall profits tax on the petroleum industry scheduled to raise Federal revenue in excess of $225 billion. This tax is certainly offsetting all of the subsidy. This tax is a tax on petroleum alone, so it doesn't fit into the normal tax picture but it does exist and it is monumental.

Second, the oil industry pays, and Marathon pays millions and millions of dollars a year in bonuses for offshore leases. I know of one which went for as high as $215 million. These bonus payments represent another benefit accruing to the Federal Government that should be looked at as offsetting some of the subsidies you referenced—and I cannot quantify exactly, looking at this $123 billion number—whether it is $123 billion or not. I don't know exactly what this estimate is so I can't say.

Mr. DASCHLE. Well, that was a DOE study. The last question I have——

Mr. WILKINS. Well, one other point in the GAO study on ethanol tax incentives it is stated that today's subsidies on ethanol exceeded, unitwise, the subsidies provided petroleum.

Mr. DASCHLE. Well, I think you may compare that today. It would be interesting if you went back and could compare the total subsidy that we've given oil, $123 billion, with the total subsidy we've given ethanol, $225 million. I would want to be hard pressed to say there's any equity with regard to subsidy, even if it was on a per unit cost. A moment ago you said something that was interesting. I'd just pursue it for a moment.

You said that you had paid an additional fee which should offset the tax credits, and tax exemptions, and various tax benefits you received and because of that it's more justified. If we could then make the case that obviously we would bring down the cost of the farm program perhaps by $9 or $10 billion, would you then extend that rationale to save the $225 million as probably worth the investment?

Mr. WILKINS. Sir, I think if I could be convinced that was the case, I would tend to agree. However, realistically, I think the subsidy is going to go up, and up, and up, and I fear that because Marathon—and companies like the Marathons of this world—are disadvantaged some number of cents per gallon right now—we have to make a decision. Which way do we go? Will the Federal Government subsidy stay in place and absorb any cost? If Marathon commits to blending ethanol, we're looking at somewhere around doubling the present cost—at what point does it get too big? At what point does the ethanol subsidy become so burdensome that the rug has to be pulled and Marathon is left engaged in costly uneconomic enterprise?

Mr. DASCHLE. Well, Mr. Wilkins, I just wish you'd have that same philosophy with regard to subsidies for the oil companies. You can't say it's OK just on the one hand. I haven't heard the oil companies, after receiving billions of dollars in depletion allowances and other tax benefits, telling Congress: "Hey, that's enough. We don't want any more." You know, that didn't happen.

Now, that we're trying to provide the same kind of an incentive for a fledgling, alternative-energy industry to solve the problems with the environment and solve the problems of dependency, we have the oil companies saying: "Well, it's alright for us to have spent $123 billion in tax incentives of all kinds, and loss from the Federal Treasury for support for the oil companies, but it's not all right for ethanol."

I think we need some consistency here. I think it's ridiculous for the oil companies to come to Congress and say it's all right for us but not for them. That's why we got into trouble in the first place. And I just hope we can make a change in the near future, and show some consistency, and maybe a little more farsightedness when it comes to energy policy in this country.

Mr. **Wilkins**. Could I ask the Congressman a question?

Mr. **Daschle**. Any time.

Mr. **Wilkins**. The market share for ethanol increased in 1983 over 1982 by 90 percent, essentially doubling in 1 year at 5 cents.

Mr. **Daschle**. The market share of what?

Mr. **Wilkins**. Of ethanol, increased, doubled. The sales of ethanol doubled in 1 year. At a total subsidy of 50 cents Federal plus State subsidies.

Now, I'd say that that's a fairly healthy market-share increase and is the sign of a growing, burgeoning industry that is taking off and will succeed. Then, logic leaves me. Why did we increase it 1 more cent? Was not a doubling market share last year enough? And, if it isn't, then companies like Marathon are going to have to move pretty fast.

Mr. **Daschle**. Well, I think in the oil business, as it is with just about any industry, what you find is that continuity is extremely important. We've had witness after witness come to us and say: "We've got to have continuity; we've got to have some consistency; we can't have a balkanization of the program as we've seen in the last 4 or 5 years."

I think it is remarkable that we have seen a 200–300-percent growth but I think with some continuity, with some consistency, that with some regularity as we go from State to State, that growth could have been 1,000 percent. Who knows? With the potential under these extreme circumstances as good as it was, then it seems to me that there's almost unlimited potential for growth.

That's why I support the federalization and that's why I applaud your question. It makes the case as well as anyone can make for the need for a federalization program. I just hope we can have the support of Marathon if that issue comes before the Congress in the future.

Thank you very much.

Mr. **Dorgan**. Thank you. Any other questions?

[No response.]

Mr. **Dorgan**. We thank the panel for the presentations. They were excellent and your full statements will be made a permanent part of the hearing records.

The next panel we will call up will be David Hallberg, president of the Renewable Fuels Association; Todd Sneller, Nebraska Gasohol Committee; Jack Moors, Nebraska Corn Growers; Barry Direnfeld, New Energy Corp.; and Dr. Alfred Hotz, professor at Augustana College.

I'd like also to ask Dr. Paul Middaugh, if you would care to join us in this panel? And this is the final panel that is scheduled and we're running pretty close to on time.

We would like at this time to hear from Mr. David Hallberg who's president and CEO of Renewable Fuels Association.

David, welcome.

STATEMENT OF DAVID E. HALLBERG, PRESIDENT/CHIEF EXECUTIVE OFFICER, RENEWABLE FUELS ASSOCIATION, WASHINGTON, DC

Mr. **Hallberg**. Thank you very much, Mr. Chairman. In the interests of time, I would ask permission to submit my written remarks and I'd like to keep my oral comments very, very brief. If it's alright with the chairman, I would like one of my board members, Mr. Doug Snyder, to fill in the last couple of minutes if the time allows.

I commend you and Congressman Jacobs for taking time out of your July 4th weekend to come to Sioux Falls to discuss this issue because I think it's a critical one that extends beyond just the question of fuel ethanol.

I think the substance of today's field hearing is an attempt to get to the root of the question as to whether or not, and in what form, it is appropriate that tax policy should be used to influence alternative energy policy. I know that the staff and other members of the committee have oftentimes questioned whether or not it's appropriate to use the Tax Code as a vehicle to stimulate directions in alternative energy policy in this country, in this case, specifically, alternative liquid-fuels policy which is our most critical energy need. I think that, in fact, this hearing will hopefully establish at least the start of a record on which the committee can determine whether or not it is in the national interest to advance the fuel ethanol industry.

For you to make that determination, it's necessary, obviously, to recognize linkages of many issues which have been recognized here today, and then to attempt to quantify the costs and benefits to come from those. It's a very complicated industry; over the past 5 years, we've found that people have looked at it only from the energy side and come up short, while people that have looked at it only from the agricultural perspective have done the same. But when combined, there's this synergy that's very important and can be quantified.

One of the members of the panel here today talked briefly about a GAO report that has attempted to do that. I'd like to cite just several specifics very briefly where I think today it's been pointed out that there are some linkages that this committee can begin to address in making policy for the 99th Congress.

The first would be obvious which is agricultural outlays. I understand the problem with many jurisdictions and overlaps that you face with the agriculture committee and what have you. But I do think it's important, especially in the context of a reconciliation bill which you undoubtedly will face in the 99th Congress, that somehow the Ways and Means Committee is able to interact with the Agricultural Committee and try to adopt some cost-benefit targets in which you can establish whether or not it does make sense to the reduction of the Federal deficit.

The second is the EPA lead phaseout. There are two specific issues I think that are important to the national interest and I think they're important to the Ways and Means Committee. The first is, in light of EPA's evident determination to move ahead with the accelerated phaseout of lead, does it make sense for this country to establish a policy that will stimulate an additive like ethanol that not only has the other benefits that have been talked about, but that also would help both (*a*) establish the survival of independent refineries; and (*b*) that would help to prevent the headlong rush of refineries to invest in very expensive energy-intensive reforming equipment.

I believe that that is also another area that can be calculated and needs to be looked at.

The last point that I know the staff is very interested in—and it should be so—Mr. Wilkins of Marathon addressed it several times—the fear that ethanol will be chronically uncompetitive and will always depend on tax incentives. We believe that Mr. Wilkins' view is extremely shortsighted; that it takes a static view of this industry that has not been borne out in the past few years. The best example of this is that, as more production of ethanol occurs, it will be valued at its highest level which is as an octane enhancer to replace benzene, and toluene, and others which now are at least 40 cents higher than the market price that ethanol receives because oil companies don't want to buy it.

So we believe that gap will close; the best evidence there is 4 years ago, gasoline was 35 cents and ethanol $1.85. Today, the price is $1.00 for gasoline and $1.55 or $1.60 for ethanol, and we believe that trend will continue.

The very last point I'd like to make is that there seemed to be two major objections raised here today. One from Marathon that since they don't have ethanol, they're disadvantaged in the marketplace. It seems to me from a public-policy side, the best answer to that concern for Marathon to simply build more ethanol facilities.

The second objection was the AAA's concern about the trust fund. I would think that that's one of the easiest problems to solve—as opposed to energy or agricultural problems—in that the reimbursement of the Highway Trust Fund from general revenues could be effected as a matter of public policy, so the highway community would not have to bear that cost.

We greatly appreciate the opportunity to submit these views. If agreeable, I'd like to leave my seat and allow Doug Snyder to fill my remaining time.

Thank you.

[The prepared statement follows:]

STATEMENT OF DAVID E. HALLBERG, PRESIDENT, RENEWABLE FUELS ASSOCIATION

Thank you, Mr. Chairman. On behalf of the membership of the Renewable Fuels Association, and the industry it represents, I would like to commend you and your Committee for providing this opportunity to submit views on the status of the domestic fuel ethanol industry. We especially appreciate your leadership in this area, as well as the farsighed support of your colleagues like Congressman Thomas A. Daschle, whose tireless efforts have contributed significantly to the dramatic growth of our fledgling industry.

It is very appropriate that this Committee conduct this oversight hearing on the status of the U.S. fuel ethanol industry at this particular juncture in its development. Coming on the heels of Congress' recent action to reduce the federal excise tax on renewably-derived fuel alcohol blends by an additional penny (to a tax of 3¢ out of the total 9¢ per gallon) effective January 1, 1985, this field hearing is an important step in the effort to build a comprehensive record on which to measure the cost effectiveness of the incentives that have built this new industry. After the first five years of the fuel ethanol industry's commercial development, there should be sufficient evidence of its effects for the Congress to make an informed judgement on its contributions to national objectives.

Any evaluation of the U.S. fuel ethanol industry is necessarily complicated by the fact that it is an exceptionally complex industry, which combines many different dimensions and crosscuts a variety of interests. The failure to accurately identify all of these components of fuel ethanol production and use, and to fully measure the many benefits that come together in an uniquely synergistic way, would mean substantially understanding the industry's value. At a time when the Congress is confronted with the increasingly difficult challenge of deciding what is or is not cost effective for the taxpayer, it is especially important that the Ways and Means Committee has access to all the information about how fuel ethanol impacts on the many different areas of other Committee's jurisdiction: agriculture; energy; environment and health; refinery and transportation policy; R&D; and national security, just to name a few. The fuel ethanol industry is very confident that the record build during its first five years of commercial development will withstand this rigorous cost/benefit assessment, and welcomes the opportunity to make known its views to the record.

In view of the severe time constraints facing the Committee, I will keep my oral remarks very brief, and would ask permission to submit more detailed information for the record.

In the few minutes remaining, I would like to focus on the four major dimensions of fuel ethanol's impact on the economy and federal budget. I believe it is not an overstatement to claim that fuel ethanol production and use in a uniquely synergistic activity and that this can be best demonstrated by evaluation its agricultural; energy; and environmental/health; and reindustrialization impacts.

I. AGRICULTURAL IMPACTS

Unlike any other liquid fuel alternative available in the forseeable future, fuel ethanol is uniquely derived from a wide range of renewable feedstocks. While even now, U.S. fuel ethanol production technology utilizes such diverse feedstocks as grain, cheese whey, citrus wastes, and forestry residues, by far the predominant material used by the industry's 70-plus production facilities is corn. As such, the U.S. fuel ethanol industry represents an already important—and potentially major—new domestic outlet for our nation's corn producers.

There will undoubtedly be other witnesses far more expert than I that will do an in-depth review of ethanol's numerous agricultural benefits. However, I would briefly like to cite three of its primary elements: (1) fuel ethanol provides a desperately needed stable domestic outlet for U.S. agricultural production at a time when its conventional markets, including export markets (see Attachment A), are stagnating or even declining; (2) it provides these new outlets in a way that adds value to America's most important commodity export, thus stimulating a much needed shift from a predominantly bulk export-oriented policy (which exports jobs and investments overseas) to a "value-added" policy, which ripples through the depressed agricultural sector of our economy and has a major positive impact on the economic sector, which accounts for roughly 25 percent of total GNP; and (3) it establishes the foundation for a shift to a market-oriented agricultural policy, where increased domestic demand will replace costly and unproductive efforts to achieve supply/demand balance by idling acreage. This "supply-side" approach benefits farmers, consumers, and taxpayers, and should be a top priority for agricultural policymakers in next year's farm bill.

I would like to briefly respond to two popular misconceptions about fuel ethanol's agricultural impacts: (1) contrary to the contentions of its detractors, fuel ethanol can simultaneously benefit farmers, consumers, and taxpayers; and (2) there is not a "food vs. fuel" tradeoff. Due to ethanol's demand side stimulus, commodity prices can be increased over time in a way that substantially increases net farm income, reduces taxpayer exposure, and yet has a negligible impact on the consumer's food bill. As the recently completed GAO analysis of the fuel ethanol industry found, for instance, a doubling of the current industry to one billion gallons of ethanol annually would mean an increase in net farm income of over $3.5 billion. As a result of the additional 400 million bushels of corn disappearance, prices would rise 25-40¢ a bushel, thus significantly reducing government exposure to deficiency payments to producers (even a few cent increase that lifts the market price over the loan rate, times the number of bushels of eligible corn production, would save taxpayers hundreds of millions of dollars), loan supports, and surplus storage costs. And finally, because the corn itself is such a small percentage of net food costs to the consumer (frequently, 3-5%), recent studies have found that ethanol production from corn alone would have to increase to at least 2-3 billion gallons annually before food prices would be significantly affected.

The "food vs. fuel" issue has, for all practical purposes, been totally discredited. The past five years have conclusively demonstrated the strong demand that exists at home and abroad for the high protein concentrate that is one of the co-products of the production process. The starch is transformed into a valuable liquid fuel and octane enhancer, and the protein, vitamins, and minerals are transformed into a more easily transported and stored material. Attachment B is a reprint of a recent foreign affairs commentary in which I argued that a logical reorientation of our grain export policy to the Soviet Union would emphasize increasing U.S. fuel ethanol capacity to a level capable of first turning the starch of the grain destined for that country into fuel ethanol, and then exporting high protein concentrate. The Soviet Union (as with many others of our trading partners) would benefit from a concentrated product that better addresses their severe protein deficiencies, while we would gain from a valuable alternative liquid fuel, increased jobs, improved farm income, and substantially improved balance of trade.

II. ENERGY IMPACTS

In the past five years, fuel ethanol has proven beyond any doubt that it qualifies as an exceptional high grade liquid fuel extender and octane enhancer. In 1983, U.S. motorists drove over 80 *billion* trouble-free miles on over 4 billion gallons of ethanol-enhanced fuels, making ethanol the most significant liquid fuel alternative in the commercial marketplace.

In 1984, experts predict that ethanol-enhanced fuel sales will exceed 5 billion gallons, a figure that represents over 5 percent of total gasoline nationwide. Contributing to this burgeoning demand is the fact that all major automakers recognize ethanol-blended fuels under their performance warranties (a fact which distinguishes it from other alternatives like methanol).

In 1983 and 1984, fuel ethanol displaced the equivalent of over 20 million barrels of finished gasoline, conservatively worth at least $800 million. It is legitimate for the fuel ethanol industry to compute its displacement effect on the basis of more expensive finished gasoline impacts (roughly $1.00 gal.) as opposed to average $30/barrel crude oil imports, because ethanol is itself an already refined, high value component that serves as an excellent motor fuel octane enhancer. In fact, a growing number of experts argue that ethanol's value is far above that of finished gasoline, since the addition of 10% ethanol to 90% gasoline results in an average 3-number increase in the fuel's octane level. As Attachment C makes clear, ethanol is superior to the other most commonly mentioned options to lead for octane improvements in terms of both octane blend values and cost per octane barrel of improvement (when the tax incentives are considered).

Attachment D underlines another very important dimension of ethanol's energy role, which is its excellent capability to displace oil by virtue of its combined displacement and energy savings effect. Relative to other oxygenates, Ethyl Corp. analyses found that ethanol was by far the most significant displacer of crude oil in part because it also allowed the refiner to reduce his energy losses caused by high severity reforming. As EPA moves to accelerate the phaseout of lead in gasoline, this energy savings effect will become even more important and pronounced.

In the past, certain detractors of the fuel ethanol industry have sought to dismiss its importance on the grounds that it was unable to totally displace the roughly 100 billion gallons of gasoline burned by American motorists each year. The fuel ethanol industry is the first to admit that it does not represent a total solution to U.S. liquid fuel needs, but there is no panacea. No one technology will emerge in the forseeable future to pick up the nearly exclsuive role that crude oil has played in the past few decades. Attachment E helps to focus on a more relevant index. Against the backdrop of increasingly scarce domestic oil reserves, U.S. finished gasoline imports have risen steadily, to where 250,000 barrels/day—over 90 million barrels a year—of finished gasoline was imported in 1982, at a cost of well over $3 billion. These finished gasoline import expenditures represent little in terms of an "investment" for those billions of dollars drained out of the country each year: no refining jobs, no U.S. resource utilized, no new tax base created. Here, the fuel ethanol industry's production potential can be put into a more realistic perspective. Depending on which assumptions are used to calculate ethanol's crude savings effect at the refinery, its production today already represents nearly a 10 percent reduction in finished gasoline imports, and it is very realistic to project ethanol's ability in the next few years to back out nearly 100 percent of the need for imported gasoline, provided the proper signals are sent.

III. ENVIRONMENTAL/HEALTH IMPACTS

Attachments F, G, & H speak for themselves in terms of the major campaign that has been directed at achieving the elimination of lead from gasoline. Ethanol's very positive environmental characteristics (reductions of CO and HC tailpipe emissions) have been widely acknowledged for several years, but the addition of its ability to replace lead at the refinery as an octane enhancer (mentioned earlier) adds up to an extremely significant contribution to national environmental and health objectives.

While it has always been difficult to quantify the tangible net gains to the economy of something like ethanol's ability to displace lead, the EPA recently completed a widely hearlded cost/benefit analysis that found lead's elimination from gasoline would constitute a net national benefit of $800 million annually by 1988. Obviously, ethanol's contribution to realizing this benefit should in some way be "credited to its account."

Ethanol's ability to serve as a substitute for lead takes on added significance when viewed against the backdrop of U.S. refinery policy and the substantial "octane gap" that will result if EPA takes its expected action to accelerate the phaseout of lead beyond the current 1.1 gram per leaded gallon (gplg) standard that took effect last April. As a result of the EPA decision to "phasedown" lead usage, the projected "octane gap" over the multi-year period until 1992 (when lead was initially projected to be eliminated as a result of the replacement of the older leaded automobile fleet by newer, unleaded only automobiles), was computed to be a cumulative 21 billion gallons of "alcohol equivalent". While this is a substantial enough figure by itself, estimates of the octane gap that would result from the expected EPA accelerated phaseout of lead range from an "alcohol equivalent" of between 35 and 50 billion gallons over the period!

It would be optimum if the Ways and Means Committee could balance the public policy benefits of stimulating increased ethanol production as a substitute for lead as an octane enhancer against those allowing the massive refinery expenditures in capital equipment (reforming equipment, etc.) that will otherwise be required. The nation would benefit from a stimulated agricultural sector: increased displacement of foreign oil imports; the ripple effects of increased domestic investment; a more competitive oil industry; a medically safe; and environmentally benign product; and a solid foundation for a renewably-based liquid fuel technology whose R&D potential is almost limitless as a source of stable, reasonably-priced liquid fuels in the future.

A final reference to ethanol's increasing role as an octane enhancer is in order here. Rather than being forced to price position against the "composite price" of gasoline as is now the case, the arrival of ethanol as a higher value octane enhancer will ensure that it will not be a "chronically uncompetitive" alternative as some of its detractors now claim. Ethanol's increasing value as an octane enhancer, coupled with the inevitable advances in production technologies, should ensure fuel ethanol's competitiveness by the currently scheduled expiration date of December 31, 1992.

IV. REINDUSTRIALIZATION IMPACT

It only stands to reason that the fuel ethanol industry's capacity to invest dollars that would otherwise be "exported" to foreign producers in U.S.-produced steel and equipment, jobs and feedstocks has a substantial and positive impact on the nation's "reindustrialization" effort. This benefit is especially valuable because the bulk of the investment happens to be now occurring largely in the so-called "Rust-Belt" of the Midwest, ranging from farm communities like Walhalla, North Dakota, to engineering firms like Davy McKee in Chicago. Some of the country's most economically depressed areas are increasingly benefiting from the economic ripple effects of the new stimulus the fuel ethanol production and marketing activities bring with it.

The attached set of conclusions from a recent Georgetown University Center for Strategic and International Studies (CSIS) analysis of the national security impacts of the emerging fuel ethanol industry (Attachment I) details not only the important national security contributions, but also points out ancillary economic benefits, like a net balance of trade gain of roughly $2.5 billion annually from a 2 billion gallon industry (combined oil import reduction and high protein co-product exports). Other recent analyses, such as the recent GAO effort, found the fledgling industry has already created tens of thousands of jobs, reduced net government spending, and stimulated well over $1 billion of investment in plants and equipment.

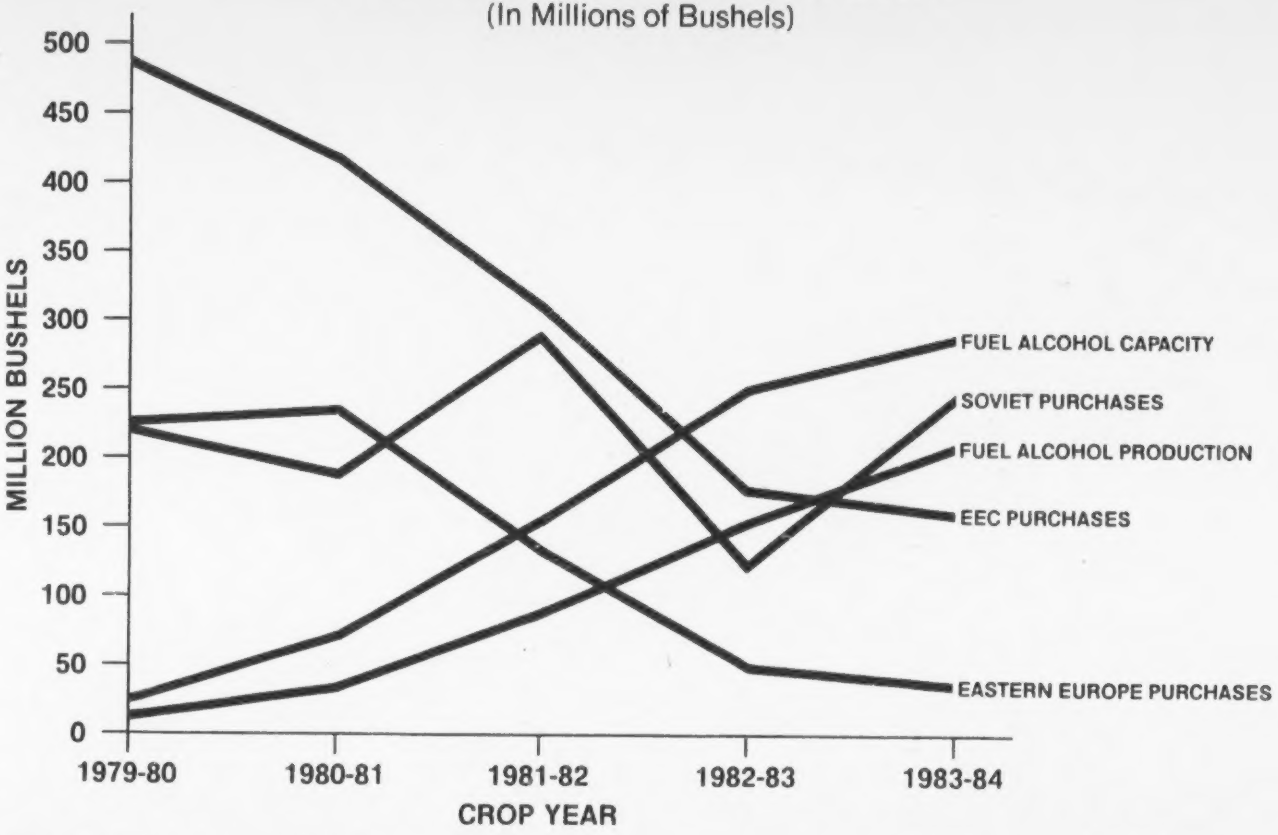
CONCLUSION

While it does not represent a panacea, the U.S. fuel ethanol industry has clearly demonstrated in the first five years of its commerical development that it makes a uniquely synergistic contribution to national energy, agricultural, environmental/health, economic and national security objectives. The Congress has played a critical leadership role in advancing the industy's development through this stage, especially as a result of "objective" tax incentive treatment. It is important that the Oversight Subcommittee of the House Ways and Means Committee does its best to fully weigh the industry's cost and benefits, and that a finding that the net benefits to the taxpayer were positive should result in Congressional support for the final realignment of the Federal excise tax exemption at a level high enough to enable the 32 (soon to be 33) states that offer their own exemptions to get out of the business. A sufficient Federal exemption (8¢ from the 9¢) coupled with the resultant octane gap from EPA's accelerated phaseout of lead, could combine to greatly expand a potentially major new industry.

Mr. Chairman, the U.S. fuel ethanol industry firmly believes that the evidence fully supports its claim that it is a positive investment in many of the country's important energy, agricultural, and environmental goals.

MARKET FOR U.S. CORN

(In Millions of Bushels)



Alcohol Information: Industry Estimates

Export Information: Sparks Commodities

Renewable Fuels
Renewable Fuels Association
499 S. Capitol Street, Suite 420
Washington, D.C. 20003

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Vol. 129 WASHINGTON, MONDAY, APRIL 25, 1983 No. 53

House of Representatives

PROBLEMS FACING U.S. AGRICULTURE

HON. BERKLEY BEDELL

OF IOWA

IN THE HOUSE OF REPRESENTATIVES

Monday, April 25, 1983

● Mr. BEDELL. Mr. Speaker, of all the many pressing issues this Congress will be addressing during the coming months, some of the more crucial will have to do with agriculture. With increasing regularity, we are faced with unsurmountable evidence that the problems confronting U.S. agriculture are structural. The amazing productivity of the American farmer has led to mounting surpluses that threaten to overwhelm the conventional sources of demand for food, feed, and fiber, and the search for balance is driven not just by the desire to end the billions of dollars of taxpayer outlays required to pay for land idling and surplus commodity storage, but also to reduce the growing pressures on the international trading system.

Perhaps never before has the need for farsighted changes in agricultural policy been so urgent. There has always been a great deal of discussion about how new domestic outlets for domestic agricultural production can be encouraged with a minimum of Government interference, and in a cost effective way, but today, those new outlets are needed as part of a structural reorientation of American agriculture. The objective must be to stimulate new value added processing industries that will utilize U.S. agricultural production in a way that benefits consumers, producers, and taxpayers alike by providing demand for fuel and chemical outlets, in addition to the conventional food, feed, and fiber.

A recent analysis of some of the perceived changes in Soviet agricultural policy since Yuriy Andropov's rise to power is worthy of consideration in this regard. In a recent Pro Farmer article, a highly regarded Soviet analyst noted that changes in Moscow's approach to agriculture point to a "livestock policy emerging which counts on domestically grown feeds, possibly supplemented by high protein concentrates as the best for the maintenance of these animals." To some, this may appear to be yet a further exacerbation of our current export problems, in which past customers are moving further away from consumption of excess U.S. production. However, this change in policy could actually afford the United States an opportunity that could enable us to contribute toward a number of important national objectives simultaneously. This opportunity should not be lost.

As the attached article printed in last summer's Foreign Affairs magazine points out, a U.S. fuel ethanol industry would provide our agricultural policy makers with a new degree of much-needed flexibility. By converting the starch portion of U.S.-produced corn and other grains into a high grade liquid fuel (ethanol), while still preserving all of the original protein, vitamins, and minerals, U.S. grain undergoes a value added process that meets both United States, and Soviet—or any other trading partners'—needs. The concentrated—one third the weight—high protein coproduct is an excellent animal feeding material, and its transportation and storage is far more efficient than that of the bulk grain. The U.S. benefits by the production of a high grade liquid fuel extender and octane enhancer, increased economic activity and jobs, and improved trade flexibility, and the Soviets and other United States customers benefit from a concentrated feeding product that more efficiently suits their needs.

Mr. Speaker, I commend this article to my colleagues' attention as we begin to focus on the crucial agricultural policy questions in the weeks to come.

The article follows:

[From Foreign Affairs, Summer 1982]

MORE BANG FOR THE BUSHEL

To the Editor:

Karl-Eugen Wadekin's Spring 1982 look at "Soviet Agriculture's Dependence on the West" was a thought provoking analysis that should be required reading for U.S. agricultural policymakers of all stripes. While it is certainly lamentable, there can be little doubt that American agriculture's profitability under the current method of "doing business" is heavily dependent upon sales to Moscow.

In analyzing what to expect in the way of Soviet grain purchases for the next five or more years, Mr. Wadekin acknowledges that Moscow will try very hard to cut down on food imports and speculates that the American farmer will find his market reduced thereby within a few years.

Such a scenario is not hard to envision. As a result of the grain embargo imposed by President Carter in response to the invasion of Afghanistan existing grain trade agreements with the Soviet Union have been upset and the embargo has relegated the United States to the position of a supplier of last resort. Further exacerbating the dissolution of Soviet reliance on long-term U.S. grain sales are the Reagan Administration's current efforts to induce tight credit restriction policies vis-a-vis Moscow. Continued reliance on the Soviets as an outlet for U.S. farmers overproduction will lead more often than not to excessive grain surpluses, with the attendant surge in federal price supports and storage costs, and worsened balance of trade.

Beyond the economic costs of a continued dependence on Soviet/East bloc grain import demand, there are also significant political and foreign policy costs. Due to the importance of key farm-bloc supporters in the Congress, for instance, the Reagan Administration has been unable to take the full range of actions (including another grain embargo) against the Soviet Union for its role in the brutalization of Poland. Our European allies have cited the decision not to end U.S. grain shipments as part of the reason for their refusal to comply with suggested U.S. sanctions against the Siberian natural gas pipeline.

Obviously, it would make good sense for the United States to commit itself to developing alternative outlets for U.S. grain production. Mr. Wadekin's article did reveal one dimension of Soviet agriculture that offers a significant opportunity for the United States to create greater U.S. grain trade flexibility.

Mr. Wadekin's revelation is that "the Soviet Union lacks protein feed . . . To compensate for the declining percentage of forage and dry roughage and increased quantities of grain feed, protein additives should be more than doubled." This need for increased protein additives could easily be met by U.S. exports in a way that would greatly increase U.S. flexibility, stabilize farm income, create jobs and productive investment and, not incidentally, provide a high grade alternative liquid fuel capable of "backing out" crude oil imports on a least a one-for-one basis. This could be achieved by assuring that a portion of all grain bound for the Soviet Union—and elsewhere—was first processed into alcohol fuel and its high protein co-products.

The production of ethanol from grain is steadily increasing today in the United States, last year, hundreds of millions of gallons of ethanol-enhanced fuel were consumed by American motorists. What is not widely known is that, in utilizing grain as the feedstock for fuel alcohol production, only the starch is consumed. The resultant high protein co-products have been widely proven to be superior food and feed materials. One 56 pound bushel of corn, for example, when processed by a "wet-milling" facility, yields, in addition to over 2.5 gallons of anhydrous ethanol, the following: 1.7 pounds of corn oil, 3 pounds of corn gluten meal (a 60 percent protein product in great demand by the broiler and layer industries), 14.3 pounds of corn gluten feed (a 21 percent protein material, nearly 3 million tons of which were exported last year to the European Economic Community by U.S. producers), and 15 pounds of highgrade carbon dioxide. In a "dry milling facility, besides the 2.5 gallons of ethanol, nearly 17 pounds of a 28 to 32 percent protein material called Dried Distillers Grain (DDG) remain after the process.

It is important to note two things about these high protein co-product streams of fuel alcohol production. First, they are superior for use as protein additives for animal feeding purposes. Second, they offer the needed nutrition performance while requiring only one third the space and weight capacity of the bulk grain. (for corn, 18 pounds of co-products as compared to 56 pounds per bushel of bulk corn.) The Soviet Union's paucity of grain storage and handling capacity makes this concentration effect of great value indeed.

In this process, the United States will have achieved multiple objectives. The most important include:

(1) *Adding a new dimension of flexibility to U.S. agricultural income and trade.* By first extracting the valuable liquid fuel from a portion of its grain exports, the American farmer can receive significant returns for the ethanol from each bushel, even if Moscow's demand for the feed portions were to decline or be cut off entirely. In the event of an unexpected disruption in trade, the concentrated nature of the high-protein coproduct would facilitate storage and lower costs when compared to that required for bulk grains.

(2) *Significantly improving the U.S. balance of trade.* The use of the fuel alcohol domestically would reduce crude oil imports on an least a one-to-one basis. In addition, the sales of the high protein co-product would generate revenue.

(3) *Stimulating an orderly redirection toward the processing of bulk commodities in the United States rather than recipient countries.* Thus, more American jobs are created, state and federal tax bases are expanded, and a solid infrastructure for future industrial development is established. (It has been estimated that, if only ten percent of the $8.7 billion worth of corn exported by the United States last year were "processed" into wet corn milling products for export, business activity would increase by $7.734 billion, creating 165,300 more jobs and raising personal income in the United States by $1.713 billion.)—DAVID E. HALLBERG, *President, Renewable Fuels Association, Washington, D.C.*

Mr. Wadekin replies:

Regarding Mr. Hallberg's comments, it is true that a higher protein content would greatly improve the average Soviet feeding ration, but it is also true that Soviet animal farms' demand for feed grain would thereby be reduced still more than envisaged in my article. As to transport and storage costs and facilities in the Soviet Union for imported proteinic co-products of fuel alcohol production, these should not be compared to bulk grains but to soybeans and their meals and other comparable commodities. These also figure high in Soviet feedstuff imports, and are likely to expand further, although they are similarly limited by transport and storage facilities and also by the capacities of the vegetable oil and mixed feed industries of the Soviet Union.

Insofar as these limits apply to fuel alcohol co-products as well, the two kinds of protein additives would be competitors in a market which, although big, is limited. According to Mr. Hallberg, the protein content of fuel alcohol co-products is yet higher; in addition, Mr. Hallberg claims that these require less processing capacities for turning them into livestock feed. To the degree that such advantages exist, potential for an expansion of U.S. exports of feedstuff of this kind, combined with the preceding use for fuel production, indeed seems to exist, and American suppliers may have a technological edge over others. However, for the reasons outlined before, one should not overestimate the net effect on the American farm sector and its exports. And after all, I did not say that overall Soviet grain purchases will probably fall earlier than the mid 1980s ●

ATTACHMENT C

TABLE 1

OCTANE IMPROVEMENT ECONOMICS

Source	Octane Cost Cost Per Octane Barrel (R+M/2)
Incremental reforming	28.0¢
Lead	7.2¢
Ethanol	18.8¢
Methanol/TBA	21.8¢
Toluene	58.6¢

Assumptions

Other Source	Cost $/gal.	Research Octane Blend Value	Motor Octane Blend Value	RVP
Ethanol	1.00	132	103	19
Methanol/TBA	0.85	118	93	42
Toluene	1.10	113	94	2
Gasoline	0.90	91	83	10
Butane	0.70	94	89	59

NOTE: Ethanol cost of 1.50 $/gal. FOB plant minus 0.50 $/gal. Federal exemption credit.

SOURCES: Octane costs for reforming and lead: Reference 5.
Enhancer assumptions: Greer, D.C. and W.J. Kulakowski, "Use of Ethyl Alcohol as an Octane Booster," 1982, NPRA Annual Meeting, March 21-23, 1982.

ATTACHMENT D

VALUE OF OXYGENATES IN MOTOR FUELS

G.H. UNZELMAN
Ethyl Corporation
Baton Rouge, Louisiana

Presented at the
46th Refining Midyear Meeting
American Petroleum Institute
Chicago, Illinois
May 12, 1981

81-2

Unfortunately, the Clean Air Act of 1970 continues to impose unrealistic emission standards on car manufacturers. Unleaded gasoline required for catalytic converters continues to grow in volume as required by new vehicles. Today, 50% of the gasoline sold in unleaded.

The crude oil penalty for this unleaded market is growing daily and will reach 110-million barrels per year in 1981. This is an insidious loss because it is unnecessary and it increases incrementally on a day-to-day basis.

Figure 3 demonstrates the crude oil conservation possible with oxygenates blended in unleaded gasoline. Petroleum energy conserved in

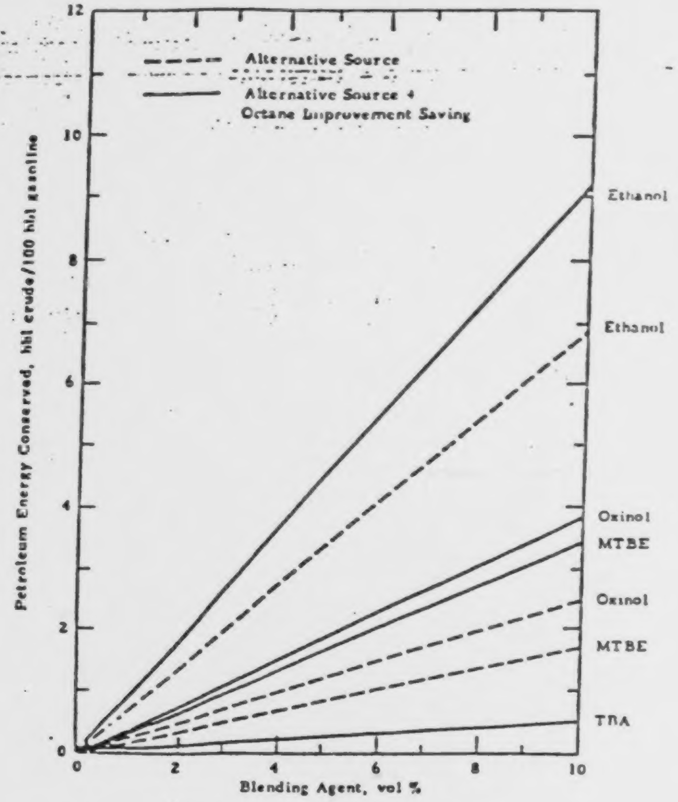

Figure 3. Crude Oil Conservation With Oxygenates in Unleaded Gasoline

Renewable FUELS

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499 S. Capitol Street, Suite 420
Washington, D.C. 20003
(202) 484-9320

David E. Hallberg
President/Chief Executive Officer

3 July 1984

CRUDE PRODUCTION & MOTOR GASOLINE IMPORTS 1973 - 1983

While 3.9% below last year for 1983 as a whole, imports have risen substantially since the seasonally-adjusted low early in 1983, topping the prior-year April-December period by 1%. Along with the recent rise in imports have come changes in the relative proportion of crude and product imports and in import sources. Between 1979 and 1983, total imports fell 43% or about 3.6 MMBD. However, all but 7% of the decline in volume occurred in the importation of crude. Product imports now represent a much larger share of total imports — about 35% more than the 23% share in 1979. This is at least a partial return to the more than 60% rate existing in 1970, prior to the imposition of price controls which encouraged importation of crude. U.S. net dependency, which had fallen from about 40% in the first quarter of 1979 to less than half that rate in the corresponding 1983 quarter, has since returned to a roughly 30% level, as demand increased, inventory levels stabilized, and export levels receded.

1973	1975	1977	1979	1981	1982
TOTAL WELLS DRILLED IN THE U.S. 1973 - 1982					
27,602	39,097	46,479	51,263	80,537	88,106
U.S. CRUDE OIL PRODUCTION 1973 - 1982 (thousands of barrels per day)					
9,207	8,374	8,244	8,551	8,571	8,648
U.S. DRILLING COSTS 1973 - 1982 (cost - $ per foot)					
22.50	36.99	46.81	67.70	94.30	N/A
ESTIMATED PROVEN RESERVES OF CRUDE OIL 1973 - 1982 (Million Barrels)					
36,339	34,250	33,502	31,335	29,805	29,426
MOTOR GASOLINE IMPORTS 1973 - 1982 (thousands of barrels per day)					
134	184	217	181	157	249

NRDC NEWS
Natural Resources Defense Council • 1725 Eye Street, N.W. • Washington, DC 20006

For More Information Contact:
Eric A. Goldstein, (212) 949-0049 or
David D. Doniger, (202) 223-8210

For Immediate Release
March 14, 1984

STATES, CITIES, DOCTORS, AND ENVIRONMENTALISTS URGE EPA TO BAN LEAD, ETHYLENE DIBROMIDE, AND ETHYLENE DICHLORIDE FROM GASOLINE

A group of states, cities, doctors, and environmental and consumer groups today petitioned the Environmental Protection Agency (EPA) to ban lead and two cancer-causing chemicals -- ethylene dibromide (EDB) and ethylene dichloride (EDC) -- from gasoline.

The petition, filed by the states of Illinois and Massachusetts, the cities of New York and Chicago, four nationally prominent physicians, and four environmental and consumer organizations asks EPA to prohibit the use of lead, EDB and EDC in gasoline by January 1, 1986. The petition cites (1) mounting evidence of childhood neurological and behavioral disorders from small amounts of lead, (2) the potential cancer hazard for millions of people from EDB and EDC, and (3) the destruction of millions of pollution-reducing catalytic converters in cars which are misfueled with leaded gasoline.

Several weeks ago, EPA officials told reporters the Agency was considering a plan to forbid the use of lead in gasoline. But the Agency has not yet taken any concrete steps to implement such a ban. The petition asks the Administrator to propose and issue regulations this year to implement a ban on the three additives by 1986 or the earliest practical date.

"The time has come to get the lead out, finally and completely. The health and well-being of millions of children is riding on how quickly and decisively EPA acts," said Eric A. Goldstein, attorney for Natural Resources Defense Council and spokesman for the petitioners.

According to just-obtained EPA figures, lead usage has not declined as rapidly as the Agency projected. Approximately 56,750 tons of lead were used in gasoline in 1983, compared with projections that usage would be no higher than 51,700 tons.

"Lead is the eye of the needle," said NRDC attorney David D. Doniger. "Ban lead and there will be no need to add cancer-causing EDB or EDC to gasoline. Ban lead and the destruction of pollution controls in cars designed for unleaded fuel will stop."

Approximately 300,000 pounds of EDB and a similar amount of EDC are emitted annually from gasoline tailpipes. Large additional amounts of these chemicals escape into the air during auto refueling at gasoline stations. Recent monitoring has revealed detectable levels of both EDB and EDC in the air of ten American cities.

The signatories to the petition are:

Illinois Environmental Protection Agency
Massachusetts Department of Health
New York City Departments of Health and Environmental Protection
Chicago Department of Consumer Services
Natural Resources Defense Council
Center for Science in the Public Interest
Consumers Union of the United States
Environmental Defense Fund

Dr. T. Berry Brazelton, a Boston pediatrician and author
Dr. Samuel S. Epstein, professor of Preventive Medicine and Community Health, University of Illinois at Chicago, Health Sciences Center
Dr. Herbert L. Needleman, Director, Behavioral Science Division, Childrens' Hospital of Pittsburgh
Dr. Sergio Piomelli, professor of Pediatrics, Director, Pediatric Hematology/Oncology, College of Physicians and Surgeons at Columbia University.

Florida's health and environmental agenices sent a separate request to EPA expressing similar concerns on March 12, 1984. And in New York, Governor Mario C. Cuomo announced that he would shortly file a separate petition asking EPA to ban lead, EDB and EDC from gasoline.

Attachment G

Twin Cities
Reader
THE NEWS, OPINION, & ENTERTAINMENT WEEKLY

Why Johnny Can't Think

You can't see it, you can't taste it, but leaded gas is damaging the minds of Twin Cities children. Parents and politicians call for a ban.

By Jay Greene

On Parade

Minneapolis DFLers invite Governor Perpich across the river for a tour of all the new development sites changing the face of one Twin City.

Blaisdell Redux

The women's club concept was something of a fiasco, so what's going on at the new Blaisdell Place?

Roy Returns

Roy Brocksmith, happy and much-applauded Guthrie Buffoon, returns for his role in the new production of *Hang on to Me*, good advice for the Guthrie where Brocksmith is concerned.

Mr. Science

The Duck's Breath Mystery Theater made him famous and now the whole troupe is coming to perform for you and you and you.

Film

Reviews of the FITC Minnesota Screen Project's *Harold of Orange*, *Firestarter*, Redford's *The Natural*, and more.

Some Like it Hot

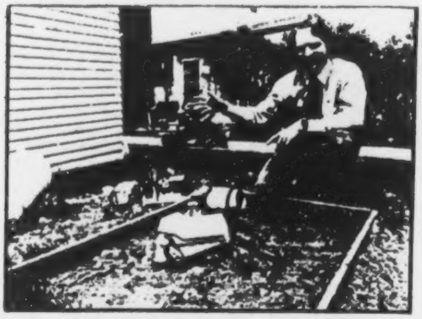
Waldemar reviews Tandoor, a restaurant she calls the best in Minneapolis for Indian cuisine.

LPs

Reviews of new discs from R.E.M., Steps Ahead, Chick Corea and the late Bill Evans.

PHOTOGRAPHS BY GREG HELGESON

Banning leaded gas has become a growing children's rights issue. Twin Cities parents and politicians are starting to jump on the bandwagon.



Getting the LEAD OUT

By Jay Greene

LEAD IN the urban environment may be suffocating the learning capacities of significant numbers of Twin Cities children. Local studies suggest that lead may be robbing children of their potential to think.

Twin Cities residents have grown accustomed to headlines announcing yet another discovery of toxic waste contamination. Residents have become indifferent to news photos of men in space suit-like gear removing contaminated soil from a neighboring suburb, relieved that their own homes and families were not threatened. That relief, however, obscures another hazard that may be mortgaging the future of their families — namely, high levels of lead in the environment.

The single largest source of this invisible menace is a grey-white metal mixed with gasoline and pumped into automobiles to help smooth engine performance. This increased performance comes at some environmental cost. Tons of exhaust from cars using leaded gas blanket the urban neighborhoods that play host to thousands of automobiles every day.

Lead contamination is a direct process. Young children who crawl around outside and suck their fingers get leaded dust into their systems, and studies suggest that even low levels of lead can severely limit the learning capacities of children.

Last Friday, city officials in Chicago took the first step toward passing an ordinance banning the sale of leaded gas within city limits. Some Minnesota state legislators this past spring hoped to pass a similar resolution banning leaded gas statewide. However, in light of the fact that Chicago expects a court battle — local control of leaded gasoline is prohibited by federal regulations laid out in the Clean Air Act of 1977 — the Minnesota resolution merely asked the U.S. Congress to ban leaded gas nationwide.

In spite of decidedly low public awareness on the lead issue, Minnesota Sen. David Durenberger has been working on lead legislation for some time. Two weeks ago he proposed a bill in the U.S. Senate calling for a national ban on leaded gas by 1988. He wishes the ban could happen sooner.

"We've been at this as a society for about 10 or 12 years," Durenberger said, "and while there is some decrease in the amount of lead in the air, it just isn't moving fast enough. The problem is not going to go away unless we move up the timeline for the eventual practical elimination of lead."

It is not news that high levels of lead are capable of crippling human mental faculties. When lead-based paint was banned over 10 years ago, most people thought the hazard would dissipate as new homes were built and old paint scraped and covered. As expected, lead poisoning cases decreased.

But studies in the last decade offer alarming data that show less obvious sources of lead may be eroding children's abilities to think, learn and properly mature. These studies suggest that children who once knew the alphabet may forget, for example, that J comes before K as a result of exposure to lead in the environment. These same children will be less alert and won't be able to concentrate as well.

"It isn't as though a little X shows up on your forehead. It's just nothing you can put your finger on. Johnny isn't doing quite so well."

The Environmental Protection Agency (EPA) announced last March that their study linked learning disabilities to leaded gas and that lead in the environment has depressed the potential I.Q. of up to 4 million American children. The study also ventured that a ban of leaded gas could save the country as much as $700 million in special education costs.

Not surprisingly, the EPA findings reveal that urban children suffer the most. Because most traffic flows toward a central point in almost any city, the children who live near high density areas are exposed to more of the toxic substance. Demographics indicate that inner city children tend to be members of lower income and minority families.

Some top manufacturers of lead counter these concerns by claiming the EPA is hyping numbers to create a crisis where none exists. EPA Administrator William Ruckelshaus publicly acknowledged the damaging effects of lead on children, and the EPA has considered banning leaded gas administratively. Unfortunately, with better publicized environmental hazards — such as acid rain and ground water contamination — competing for public attention, there is precious little in the way of public clamor to ban leaded gas.

HOWARD MIELKE, a geography professor at Macalester College in St. Paul, is an authority on the effects of lead. He's concerned about its effects on his 2½-year-old daughter.

Mielke, who's leading efforts to ban leaded gasoline, understands that the battle will be fought with limited troops. He realizes that few people know the dangers.

"[Lead's damage] is nothing specific. It isn't as though a little X shows up on the forehead. It's just nothing you can put your finger on. Johnny just isn't doing quite as well."

If the problem wasn't so subtle, he said, it would have been resolved long ago.

"It's too bad that children weren't outright just losing an arm or having that kind of problem. Instead it dulls the senses," he said.

Mielke also says the problem is particularly troublesome since it's a children's issue. The already difficult task of trying to record a child's intelligence becomes even more complicated when experts try to determine what might cause particular learning disabilities.

"How could you possibly understand that Johnny could have been a genius and he ends up with less than average intelligence because he's exposed to lead? How would you know that? You have no precedent to work from."

Mielke points to recent reports by the EPA and the Minnesota Department of Health which suggest that even low levels of lead in a child's bloodstream can cause irreversible damage to the child's brain functions. The studies insist that most of those children could be spared if leaded gas were banned.

"If you take some of these soils [contaminated with lead] that I regularly find and you put them into a paint can and send them across the state line, it would be illegal hazardous waste. Now these are the soils kids are playing in in the backyards," he warned.

Mielke's research indicates that a central point in every city bears the brunt of the community's lead output.

"It's a faulty design," Mielke said of the way cities are set up. "It's just like a car with an exhaust pipe blowing into the car. If it's faulty, you recall it. Well, how do you recall a city?"

Inner city children suffer the most from lead contamination, according to Mielke, who sees the lead problem as a civil rights issue as well as a children's rights issue. Almost every study done on the subject indicates that the nation's low income minorities have generally higher blood lead concentrations than whites.

Mielke takes precautions around his own home to protect his daughter. He wants no leaded dust tracked in, so he doesn't allow people to wear shoes inside. His daughter plays on a lawn with a healthy cover of grass that prevents exposing the soil. Mielke and his wife dust around the house often and wash their daughter's hands several times a day. As a parent concerned about his child's health, Mielke feels he has little choice but to take precautions at home and fight for a ban on leaded gasoline.

"I wouldn't get to sleep at night if I lived with this information and didn't try to do something about it."

Twin Cities residents are only just beginning to understand the problem, Mielke says. He hopes the recent interest by city, state and federal agencies indicates that a solution is in sight.

"When the citizens become aware of the problem and the seriousness of the problem,

Prof. Howard Mielke: "I wouldn't get to sleep at night if I lived with this information and didn't try to do something about it."

then I think the politicians will do what needs to be done. ... It's political from beginning to end," he said.

City and state officials have been stymied by a federal regulation prohibiting them from banning leaded gas. In fact, raising taxes on leaded gas could be construed by federal courts as violating federal law. Mielke, frustrated with the federal prohibition, sees the lead controversy as a classic state's rights issue.

"Supposedly, a state under the Reagan administration should have more rights, and here we are stuck with a federal regulation that prohibits us from doing anything about our own problem. It makes everybody inactive.

"We thought we could do something," Mielke continued. "As it turns out, we absolutely couldn't. We just didn't have any legal ground to stand on."

SEN. DAVE Durenberger might have that legal ground. As chairman of the Senate Subcommittee on Toxic Substances and Environmental Oversight, Durenberger has appropriate federal venue to tackle the leaded gas issue. Whether he and other ban backers have the political muscle is not yet clear.

Durenberger's bill would repeal a section of the Federal Clean Air Act which prohibits city and state governments from banning leaded gas, a federal regulation which the senator suggests was written to placate lead and petroleum industries. This federal regulation thwarted local efforts to ban leaded gas sales in Minnesota earlier this year.

Despite general public disinterest on the issue, Durenberger is pressing ahead, convinced it's time to act.

"I just feel strongly that we're doing things to our health inadvertently that are costly or cheaper, and they're really damaging our health," he said.

Durenberger is particularly upset with people who buy cars designed to take only unleaded gas and then modify them so they'll run on cheaper, leaded gas. He questions the integrity of consumers who may be robbing our children's futures to save a few pennies a gallon on gas.

"Forty to 45 percent of the drivers out there [the number of people who use leaded gas] think they're getting six cents on a gallon less and they don't want to give it up," he said.

Durenberger asks such people to look at the social cost.

"How many dollars is 2.6 percent of a child's IQ worth? Try to put some dollars on that baby. Maybe those who use leaded gas should ask a mother or father," he commented.

Durenberger contends that appeals based strictly on sympathy generally win very little support in the cold corridors of the federal government. To pass this bill, Durenberger says he'll need to pull a few political strings. The senator does expect the support of the EPA in the upcoming battle.

"They [the EPA] were afraid they'd get somebody who would try to kill their efforts [to ban leaded gas] over there unless they had legislative approval," he said, quoting fears that the introduction of his bill might slow the agency's move to ban lead administratively.

"The folks behind the scenes at the EPA said, 'You should go ahead with your bill and that will give us a good excuse to continue what we're doing.'

"We're going to see if we can make this a tandem process," Durenberger said.

Durenberger expects a strong lobbying response from the lead industry, which would undoubtedly lose sales totaling millions of dollars.

"[The bill's passage] depends on the reaction of the industries. It depends on people who own vehicles that might be affected in some way," said Durenberger. "It isn't easy to predict whether this is one of those things that everybody is going to stand up and support."

LAST FRIDAY, a measure similar to Durenberger's won a big victory in Chicago. The health committee of Chicago's city council voted unanimously to adopt an ordinance that would prohibit the sale of leaded gas in that city. Alderman Danny K. Davis, a co-author of the ordinance, said the law would be without precedent.

The measure awaits a final vote by Chicago's 50 aldermen on June 13. Davis, Chicago's former public health planner, was optimistic that the bill would pass.

Davis feels that the approach Minnesota took — sending a message off to U.S. congressmen urging a national ban of leaded gas — will end up as just another piece of paper on Washington desks. And while Davis expects that the city of Chicago will have a lawsuit on its hands if his ordinance passes, he hopes that by going to court, the constitutionality of the federal leaded gas legislation can be successfully challenged.

By allowing the brain functions of children to be impaired with leaded gas, Davis reasoned, the country is ignoring the health and welfare of its citizens.

"Given the movement across the country to deal with lead, we suspect the court will uphold our push to ban leaded gas," Davis concluded.

PART OF that movement is just beginning here in the Twin Cities. The Lead Coalition, a collection of six local environmental organizations, was formed here last fall with hopes of raising public awareness about lead-related health risks and the push to ban leaded gas.

Bob Nelson, chairman of the coalition, said progress is slow. Raising public awareness, he admitted, is a difficult task.

"Most of the time, you need bodies laying in the street before people get very excited," he acknowledged.

Nelson also claims that some of the industries that are trying to stifle arguments against leaded gas are almost as pernicious as the lead itself.

"Here you've got the gasoline companies and the auto manufacturers that aren't anxious to see something happen to their fuel that can raise questions and, they think, maybe raise costs," he pointed out.

"You can probably cite thousands of cases around the country where this is happening all the time, where we know about the problem, we know about the danger, we know what we should be doing, but simple greed and the simple survival of business interests keep you from doing something."

Unless something is done, Nelson suggested, the future of the nation's children may be bleak. Nelson, for instance, fills up his 1962 Chevy pickup, a car designed to use leaded gas, only with unleaded. He suggested that other people with earlier model cars should

Sen. Dave Durenberger: Asks us to consider the social costs.

Ages 1-6 Most Dangerous

Parent & Physician Warn Against Risk

By Jay Greene

JOHN MOORMAN is a member of a very exclusive club. He is one of the few Minneapolitans who is already aware of what lead is doing to children and what it might be doing to his 9-month-old boy. His fear for his son is coupled with the frustration that people forsake an important problem for trivial matters.

"People are more concerned with the Twins and the North Stars and the 'quest for the cup' and they won't take care of a problem that's in their own back yard. This really hurting our children," he warned.

Moorman, 26, lives in Phillips neighborhood, one of the busiest traffic areas in the Twin Cities. He fears for his son's health.

"This is so dangerous, especially to little kids," he said.

"I'm worried for my kid's future."

Moorman's fears began when he read an article that appeared his neighborhood newspaper, *The Alley*, last month. The article warned that the lead levels in the Phillips neighborhood were higher than in any other part of the Twin Cities. That lead, the article continued, could be causing learning disabilities in the local children.

Moorman wrote his representative in city government, Council Member Brian Coyle, asking that the city of Minneapolis ban the sale of leaded gas. In response, Coyle echoed Moorman's fears and suggested he write other council members to get a "critical mass and depth of concern" among council members. The city hasn't acted on the issue yet.

Moorman's fears may not be unfounded. Dr. Karl Chun, one of a handful of local physicians who specialize in the treatment of lead absorption in children, pointed out that about 2 percent of Twin Cities' children are reported to suffer high lead levels. But those are only the reported cases.

"That number is characteristic of the people that we screen. There's a whole population out there that we never screen and never have been screening. We don't know how bad it is out there," Chun acknowledged.

Dr. Karl Chun: a specialist in lead absorption.

He suggested the number could actually be as high as 5 percent or even 10 percent. In 1981, Chun said 167 cases of "undue lead absorption" were recorded in the Twin Cities. Although Chun noted that number was high, he pointed out that as many as 60 cases a year was the norm.

Generally, Chun said, children ages 6 months to 5 years suffer most. Low calcium intake can exacerbate the problem. Studies have also indicated that blacks have a higher blood lead concentration that whites. But Chun pointed out that those statistics can be deceiving.

"There's some thought that blacks absorb more lead. One of the problems with saying things like that is there are so many variables that are tightly correlated — being black, being poor, living in the inner city. You find those things together so often that it's hard to tell whether it's being black, whether it's being poor or whether it's living in the inner city that's causing them to absorb more lead," he pointed out.

Chun noted that being poor not only amplifies the problem but it may hamper the prevention as well. A screening specifically for blood lead concentration costs about $7 per person. The macabre irony is that the people who suffer most can do the least about it. Chances are slim that either Minneapolis or St. Paul will implement a mandatory blood screening for the cities' youth any time soon. ◻

Bob Nelson, chairman of the Lead Coalition: He fills his 1962 Chevy pickup with unleaded.

know that they can fill 'er up with unleaded too.

"People have got to realize they can make a difference instead of being overwhelmed by the immensity of all these kinds of problems. You just can't use that as an excuse. You just have got to get down to business and try to go after the problems as you see them."

Brian Ettewold, executive director of the Minnesota Service Station Association, disagrees. He doesn't think the problem is terribly immense and doesn't think most people care about whatever problem there is.

"Are all the consumers going to pay a nickel a gallon more for gasoline to eliminate the lead problem?" he asked.

"I really wonder how they're going to answer. We already know that 15 or 20 percent of them that are supposed to be using unleaded gasoline are using leaded. They don't appear to be worried about the health problem."

Ettewold thinks that those in the Lead Coalition who are concerned about the health risk are just blowing hot air.

"Any special interest group like that always tends to exaggerate what they found. You know, liars figure and figures lie," he said.

Although hardly clinical, Ettewold offers his five children as evidence. In his 20 years working at a gas station, Ettewold figures he must have tracked lead into his house. His children, he added, also used to come down to the station when they were young. But Ettewold points out that his children get high marks in school. He considers them "exceptionally bright."

While Ettewold disagrees with the health arguments, he still believes a leaded gas ban will pass. The larger refineries, the ones with political clout, he reasons, don't have anything to lose if leaded gas is banned.

When refineries boost the octane in gas without using lead, they work with 5 percent less crude oil and the final product is more expensive. But while it will cost refineries more to boost the octane without lead, the larger companies realize that some of their smaller competition will be priced out of the market. Those smaller refineries, Ettewold noted, have little political say.

"There are refineries today that cannot meet those low lead level standards. If Sen. Durenberger's bill was to pass, probably some of those refineries that can't meet that standard would be put out of business," he acknowledged.

"The one problem would be, if you take some of those smaller, independent refiners out of the marketplace and you give control of all the refining processes to the major oil companies, you in effect give them a monopoly."

The effects of giving the larger refiners a monopoly, Ettewold pointed out, is sure to be seen at the pumps.

"Any special interest group like that always tends to exaggerate what they found."

"The price [of gas] will definitely go up and it will stay up," he said, adding that "a total ban is not going to cause any big disruption."

Ashland Refinery, the company that owns SuperAmerica gas stations and a refinery in St. Paul Park, has no problem with a total lead ban. They figured leaded gas was going to be phased out by 1990 anyway.

Will Haddeland, the regional manager for public affairs at Ashland's local refinery, said Durenberger's bill didn't turn any heads in their executive suites.

"I don't think we would have any great problem with [Durenberger's bill passing]. I don't think we'll go out and support it, but I don't think it will give us any problems," he acknowledged.

"How could you possibly understand that Johnny could have been a genius and he ends up with less than average intelligence because he's exposed to lead?"

Haddeland noted that Ashland had started to phase out leaded gas three or four years ago. Ashland, like most oil refiners, realized that leaded gas sales would decline as car manufacturers developed more and more cars that use unleaded. Only the refineries that could afford the change will survive, Haddeland pointed out.

"Some refineries haven't made the investments necessary to go to only unleaded gas. Those are the ones that will get hurt."

BUT WHILE refineries talk about the dollars and cents of a leaded gas ban, environmentalists look at another cost — the social cost. It's safe to say that the effects of lead increase health and special education costs. Those who have suffered permanent intellectual damage and have bleak futures in the workplace represent a cost to society that is difficult to calculate.

Action seems unavoidable if not imminent because of the nature of the problem. When the issue gets down to the bottom line, few will be willing to put a price tag on the healthy development of a child. □

Get Rid of Leaded Gas

NYT 4/4/83 A26

There are few more noxious and less necessary products than leaded gasoline. The lead spewing out of tailpipes is a major cause of lead poisoning that afflicts half a million young children. Mounting evidence suggests that lead in the body, even in amounts below the official safety level, can affect children's brain function.

Putting lead in gasoline also requires adding a chemical to keep the lead from gumming up engines. That chemical is EDB, a potent carcinogen whose use as a pesticide has been halted because it was contaminating food. The EDB in gas is not completely burned, as was once thought; detectable amounts foul the air of New York and New Jersey.

Leaded gasoline destroys the pollution-control devices of newer cars meant to use unleaded gas. Almost a fifth of the nation's catalytic converters have been either rendered useless by leaded gas or removed to accommodate it, adding heavily to air pollution. Drivers who switch to leaded gas can save up to 7 cents a gallon, but their selfishness is self-defeating. Leaded gas increases engine wear, tear and maintenance costs at the rate of 8 cents a gallon.

The Environmental Protection Agency has tried for a decade to phase out leaded gas. Rules issued in 1982 envisaged that it would gradually disappear by 1992 as more and more cars requiring unleaded gas join the national fleet.

The widespread misuse of leaded gas means that attrition alone will not work. E.P.A. officials now talk about banning leaded gas within two or three years, leaving only a lightly leaded gas for certain vehicles that cannot do without it. But this trial balloon may not fly: Administrator William Ruckelshaus cautions that no decision has been made.

A ban on leaded gas would cost refiners $500 million a year and would be passed on to consumers. But they would gain $1.3 billion from reduced auto maintenance and health care savings. The net benefit, according to E.P.A., would amount to nearly $800 million a year by 1988.

The Natural Resources Defense Council and the New York City Health Department have petitioned Mr. Ruckelshaus to phase out the production of leaded gasoline by 1986. Some regulatory issues, like acid rain, present dauntingly difficult choices. Leaded gas isn't one of them.

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ETHANOL:
NATIONAL SECURITY IMPLICATIONS

A Report of the Energy and Strategic Resources Program

Charles K. Ebinger, Program Director

Center for Strategic & International Studies
Georgetown University • Washington DC

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- Ethanol technology is available and operational without shake-down or pilot operations. By 1984 industry capacity will represent 500 million gallons per year. Synthetic fuels development still represents a largely unproven commercial-scale technology and will not be available in significant quantities for some time.

- The raw material, grain, is domestically produced, as is the fuel, and, if levels of production continue as predicted during the next ten years, readily available. New, less expensive cellulose or waste materials are being researched as possible future feedstocks for ethanol production. These technologies are very promising and may be available well before production reaches the 2 billion gallon level.

- Ethanol production does not compete with food production. Nor will ethanol production at the 2 billion gallon per year level affect feed exports. Exports of both bulk corn and other coarse grains coupled with processed high-protein ethanol co-products will be available in world markets at competitive prices. The promise of new conversion technologies and supplemental ethanol feedstocks additional to corn could provide the option of both feed and fuel at levels of ethanol production far greater than those existing today.

- Production can be decentralized and under the proper conditions scaled down without unacceptable economic penalties although significant economies of scale are achieved in plants of 20-60 million gallons per year capacity. Decentralized development also addresses this important security concern: movement away from the type of centralized energy production and distribution system that can be easily and systematically disrupted.

- New capacity can be added reasonably quickly--under some scenarios, this could be beneficial when facing oil supply cutoffs of more than 12 months. Future oil supply disruptions could last longer than previous ones, and under these conditions ethanol's contribution would be positive.

- If oil prices should rise considerably during an interruption, then ethanol may become economically competitive without subsidies. Even without disruption, the real price of oil is likely to rise in the late 1980s and 1990s just as the current tax-credit program is eliminated. Thus, ethanol will continue as a viable industry.

- The ethanol industry provides a net balance of payments benefit. These gains continue at least up to the 2

Mr. **Dorgan**. If you would like to continue, please feel free. If you would just state your name for the record?

Mr. **Direnfeld**. Does this microphone work?

Mr. **Dorgan**. No; that's the one for the—oh, OK.

STATEMENT OF BARRY B. DIRENFELD, PRESIDENT, NEW ENERGY CO. OF INDIANA

Mr. **Direnfeld**. Mr. Chairman, my name is Barry Direnfeld. I'm president of New Energy Co. of Indiana. I certainly appreciate having the opportunity to testify before this committee. I think that today's hearing has been very useful.

Before I talk about how the Federal ethanol fuel tax incentives have impacted the development of the alcohol fuel industry, I'd like to take a moment to tell you a little bit about New Energy.

Our company's formation was a direct response to the enactment of Energy Investment Tax Credits and the exemption of ethanol blends from the Federal excise tax on gasoline. Often Congressmen ask if people really pay attention to their proposals. We did. We created a company which has over 3,200 limited partners; which invested $185 million in South Bend, IN; which was chosen among 750 applicants by the Department of Energy to receive a loan guarantee; and which is presently constructing an alcohol production facility capable of producing 52½ million gallons of ethanol a year.

Our plant is being built by Davy McKee Corp., one of the world's largest construction firms. It is ahead of schedule. And we're under budget.

Usually, alternative energy or synfuels projects are synonomous with overruns and delays; but in our case and with many fuel alcohol projects, this is not true.

Our plant will be the largest grassroots ethanol facility in the world. During the last 2 years, more than 700 construction workers have been employed at our plant site at South Bend, IN. When we begin production, almost 1,000 new jobs will be created in the northern Indiana market.

We've had an enormous impact on the local economy, having spent almost $70 million on payrolls, supplies, services, and equipment just in the northern Indiana area alone. This should point out the industrial development aspects of the ethanol industry.

But our project extends well beyond just Indiana; 247 different companies from firms as far away as California, Texas, Florida, Massachusetts, and New York, have provided us with goods and services during our construction phase and we're still 2 months away from production.

We're proud of New Energy and hope the members of the subcommittee have a chance to visit us when we are in operation. As I stated earlier, we undertook this massive $185 million project, because we have faith in the Federal Government's long-term commitment to ethanol.

The question raised earlier in this hearing focused on the items retarding the future development of other projects. First, one of the most unsettling aspects of our financing was this administration's proposal to repeal the excise tax exemption.

It created a tremendous risk to equity investors.

The risks associated with a change in Federal policy are very real to equity investors and should be taken seriously. The fact that the congressional conferees recently agreed to reduce the tax on ethanol blends from 4 to 3 cents a gallon, in an effort to provide a stronger measure of federalization, is the type of positive action necessary to continue the rapid growth of our industry.

Our industry has experienced several relatively easy, additions to existing corn processing facilities, however, only one or two major grassroots ethanol plants are being built. The reason for this relates to the fact that investors need to be assured that the policy of the Government is going to remain consistent.

The General Accounting Office [GAO] has recently issued its own report, which states that since 1979, the rapid growth of this industry has been directly attributed to Federal tax policy.

Since 1979, over $1 billion of capital has been invested in new plants and equipment. As Congressman Daschle just alluded, 32 different States currently have supplementary ethanol incentives in place. They vary from State to State; in amount; and in duration. Many States have also enacted parochial restrictions.

This has created a balkanized market for ethanol forcing producers, like ourselves, to ship product inefficiently. This increases our transportation costs needlessly and further delays the day when we will be able to compete with the oil and gas industry on a "level playing field," a phrase which seems to be in vogue these days.

I urge you to consider working closely with the National Governors' Association and National Conference of State Legislatures, to implement a nationwide uniform system to replace the existing patchwork of State incentives. Ultimately, I would suggest that the Federal excise tax on ethanol blends be reduced to a level of 1 or 2 cents per gallon. This would create a national market. The step that was recently taken by the Congress—and we applaud you for it—is clearly a major step in that direction.

Contrary to a suggestion of Mr. Wilkins, of Marathon Oil Co., our State of Indiana has enacted a provision to directly offset the Federal Government increases in the excise tax exemption. Increases in the Federal subsidy will result in a pari passu reduction in the Indiana subsidy.

The same is true in Michigan. Therefore, your recent action was a first step toward achieving a uniform national market for our product.

The GAO reported that the net revenue impact of the alcohol fuels subsidy to the Government—and I'm quoting now—"is not large. The cost of this subsidy is offset by savings in agricultural price supports due to added demand for corn for ethanol."

The GAO further reported that last year ethanol fuels reduced our balance of trade deficit by $210 million. It's also important to note what alcohol fuels have done to the demand for corn. Last year, our industry consumed about 150 million bushels of corn. This year the figure is likely to rise to over 200 million bushels—almost as much as the United States is selling the Soviet Union. In the very near future, the American ethanol industry will use more American corn than the Soviet Union and Eastern European countries combined, thereby creating tremendous markets at home and giving us latitude in our foreign policy.

Finally, I'd like to talk briefly about some other issues relating to energy security. Approximately 70 percent of the oil purchased by our allies comes through the Persian Gulf. Currently the United States is importing 5.7 million barrels a day of crude oil and crude product. Given these facts it is very important that we continue to develop alternative energy sources such as alcohol fuels.

In summary, New Energy, in response to congressional action, has made a substantial commitment. We think that the congressional policy initiatives have started to bear fruit in terms of industrial policy, agricultural policy, environmental policy, and in energy policy.

I urge that you maintain your consistent approach because that's the most important stimulus to get other new energy sources on line. It is also critical for this industry's ability to achieve its full potential. Thank you.

[The prepared statement follows:]

STATEMENT OF BARRY B. DIRENFELD, PRESIDENT, NEW ENERGY CO. OF INDIANA

Good morning and thank you, Mr. Chairman. My name is Barry Direnfeld and I am president of the New Energy Company of Indiana. I would like to take this opportunity to thank the members of this subcommittee, as well as Congressman Daschle, for arranging this field hearing today on ethanol.

During the five-and-a-half years since the tax incentives for ethanol fuels were enacted, ethanol has helped enhance America's energy security, created new markets for American farmers, and created new jobs and spurred economic growth throughout the Midwest. In a moment, I want to return to a more detailed discussion of the contributions ethanol has made and the important role the tax incentives have played—and must continue to play—in the ethanol story.

But first, I want to tell you a little about New Energy, a company that owes its very existence to the incentives provided in the Energy Tax Act of 1978. New Energy was formed in 1980 to build and operate an ethanol plant. We have about 3,200 limited partners, and our principal shareholders include E.F. Hutton and United Brands. New Energy was chosen from among 750 applicants by the U.S. Department of Energy to receive a federally-guaranteed loan to construct an ethanol plant on a 55-acre site we had chosen in South Bend, Indiana. This $185-million project is now nearing completion; we expect to begin production in September, with the formal opening of the plant targeted for October.

Our plant is being built by Davy McKee Inc., of Cleveland, one of the world's largest engineering and construction firms. The plant is being completed ahead of schedule and under budget. First National Bank of Chicago heads a bank consortium that has loaned New Energy $141 million. Ninety percent of this loan is guaranteed by the Department of Energy. This is the largest loan guarantee in the history of the federal ethanol fuel program.

More than 700 construction workers have been employed at our plant site in South Bend, and when we begin production in a few months, almost 1,000 new jobs will be created, 150 at the plant itself. The New Energy plant will be the largest grass-roots ethanol facility in the world. We will convert 20 million bushels of corn into 52½ million gallons of ethanol a year. We will also produce 185,000 tons of animal feed and 150,000 tons of carbon dioxide.

Our project has had an enormous impact on the local economy. To date, New Energy has spent nearly $70 million on payrolls, supplies, services and equipment in South Bend. The impact of our projects extends far beyond the South Bend area. Just as an example, 247 different companies in states as far away as California, Texas, Florida, Massachusetts, and New York provide us with goods and services. And we're still two months away from starting up production.

We are proud of New Energy, and we hope Members of this Subcommittee, as well as other Members of Congress, will visit us in South Bend and see first-hand how New Energy is working to further our nation's energy security, provide a new market for America's farmers, and strengthen the economy of the nation's midsection.

We formed New Energy and undertook this massive construction project because we have faith in the federal government's long-term commitment to ethanol, a commitment underscored by the decision House and Senate conferees took three weeks ago to reduce the federal excise tax on ethanol-blended fuel from 4 cents to 6 cents a gallon. We commend Congress for this renewed vote or confidence in the ethanol fuel program. The conferees' action shows that the program has wide, bi-partisan support in Congress. We feel this support will grow even stronger in the years ahead as our plant and other new plants go into production.

As you know, the General Accounting Office (GAO) has recently issued its own report detailing the contributions ethanol has made and will continue to make in the years head. Tax incentives have been, and will continue to be vital to the growth of our industry. These incentive enabled the industry to increase production ten-fold between 1979 and 1983, and further dramatic increases are expected in the years to come. The industry has invested more than $1 billion in new plant and equipment since 1979 because of these incentives.

In addition to the federal tax incentives, 32 states now have supplementary incentives in place. But the picture varies widely from state to state. The amounts and durations of the state incentives are widely disparate. In addition, many state statutes contain restrictive parachial provisions. This creates a balkanized market for ethanol, forcing producers to ship product inefficiently, thereby increasing transportation costs needlessly and delaying the day when the industry will be able to market product as efficiently as the oil and gas industry.

This uneven pattern of state tax incentive is one reason why we, and others in the idustry, favor eventual "federalization" of tax incentives for ethanol fuel. Working in cooperation with the National Governors' Association and the National Conference of State Legislatures, we would like to see the federal government work out a nationwide, uniform system to replace the existing patchwork of incentives. Ultimately, the federal excise tax on ethanol-blended fuel might be reduced to a level of 1 cent or 2 cents per gallon. Federalization would lead to an even greater expansion of the industry.

Now I would like to address some of the criticism that has been directed at the federal ethanol fuel program in general and the tax incentives in particular. I'm referring to those who claim that incentives are a form of subsidy the somehow "distorts" the market and creates an "uneven playing field."

We need to put the ethanol program in perspective. The federal government already provides a vast array of programs for farmers costing billions of dollars each year. The PIK program alone costs taxpayers more than $10 billion a year. Is it not better to help the ethanol industry provide new markets for grain farmers than to pay farmers not to produce corn?

The ethanol industry is already helping develop a stable, permanent market for corn farmers. Last year, our industry consumed about 150 million bushels of corn. This year, that figure is likely to rise to over 200 million bushels. That's about what we sell to the Soviet Union. In the very near future, the ethanol fuel industry will buy more American corn than the Soviet Union and Eastern Europe combined.

The revenue loss to the Treasury is modest compared to the subsidies currently being paid to farmers to take crops out of production. The recent GAO report notes, and I quote, ". . . the net revenue impact (of the incentives) on the Government is not large. The cost of the subsidy is offset by savings in agricultural price support programs due to the added demand for corn for ethanol production."

Consider too, that ethanol fuel production has an important impact on America's balance of trade. The GAO found that in 1982, ethanol fuels helped reduce our $43 billion merchandise trade balance by an estimated $210 million. Ethanol increased the value of our exports by raising grain prices and by reducing imports of foreign oil.

Finally, remember that the tax subsidies received by domestic oil and gas producers dwarf those received by the ethanol industry. According to the GAO, oil and gas producers have received more than $100 billion in tax subsidies since 1950. The vast majority of tax subsidies continue to go to oil and gas producers—not to the ethanol industry. How can our critics suggest that the modest tax incentives provided the ethanol industry "distort the marketplace" when the energy marketplace—in the words of the GAO report—"is not now, nor perhaps has it ever been, free from government intervention?"

I would like to briefly touch on two other aspects of the ethanol fuel program. Both are important factors to keep in mind as you assess the federal government's involvement in our industry.

First, ethanol fuel is making an increasingly important contribution to America's energy security. During the decade of the 1970's, two major oil supply interruptions underscored the degree to which the United States was vulnerable to costly distortions in oil prices. The current war between Iran and Iraq and recent attacks on oil tankers in the Persian Gulf should be cause for great concern, for the continued instability in that part of the world threatens our economic and military security.

With little fanfare, crude oil imports have almost doubled during the past year. Today, the United States is importing 5.7 million barrels of oil and refined product each day. We and our Western Allies, who depend on imported oil for 70 percent of their petroleum needs, cannot ignore the catastrophe that would result if the 8 million barrels of oil a day that flow through the Persian Gulf were cut off.

A few months ago, Energy Secretary Donald Hodel warned the Senate Energy Committee that "some kind of disruption of supply" of Mideast oil is likely later this year. Given this alarming prospect, doesn't it make sense to move ahead as quickly as possible to expand production of ethanol?

A recent study by Georgetown University's prestigious Center for Strategic and International Studies (CSIS) concluded that the continued growth of the ethanol fuel industry will significantly enhance America's energy security. If the industry produces two billion gallons of ethanol a year by 1990—a project in line with most industry projections—the United States could reduce its imports of foreign crude oil by nearly 50 million barrels a year, saving this country nearly $1.4 billion in our annual oil import bill.

Second, cars and trucks powered by ethanol-blended fuel are environmentally "cleaner" than those powered by leaded fuel. Ethanol's qualities as an octane-enhancing additive make it a logical replacement for lead in gasoline. The Environmental Protection agency (EPA) has already tightened regulations on the amount of lead that can be in gasoline. Projections are that the nation's refineries will face a 20-billion-gallon "octane gap" by 1990, and ethanol is expected to meet a significant share of that demand. In fact, it is possible that EPA may soon ban the use of lead in gasoline altogether, a move that would enhance ethanol's role as a fuel enhancer even more.

In conclusion, Mr. Chairman, I would submit that while ethanol is no panacea, it can and does play an important role in helping ease our energy problems, strengthen our agricultural sector, create new jobs, and spur the economic revitalization of America's heartland.

Last month, in unveiling the results of the GAO study, Senator Charles Percy of Illinois called ethanol "the fuel of the future." In many ways, ethanol is not only the fuel of the future, but the most exciting and promising fuel of the present. Ethanol is here to stay. New energy is here to stay. But we owe our past successes, our present promise and our future growth to the continued wise application of public policy at the federal level and state levels.

Enacted five-and-a-half years ago amid considerable skepticism, federal ethanol tax incentives represent one of the few successful steps we have taken to end our dependency on foreign oil and strengthen the agricultural sector of our economy.

Indeed, the ethanol progam is a rare animal—a federal government program that has accomplished its goals without delay, waste, fraud or abuse or some other violation of congressional intent. Ethanol fuel tax incentives constitute one of the few successful energy and agrucultural policy stories of our time.

Ethanol isn't the answer to all our energy, trade or agricultural problems. But in an era when many people regard many government programs as special interest giveaways or inefficient rip-offs, ethanol fuel tax incentives are one program that has worked for America.

Again, Mr. Chairman, I would like to thank you for affording me an opportunity to testify here this morning. I would be happy to respond to any questions you and your colleagues may have.

Mr. DASCHLE. Barry, thank you very much for that excellent statement.

Our next witness is the administrator of the Nebraska Gasohol Committee, Todd Sneller. Todd.

STATEMENT OF TODD C. SNELLER, ADMINISTRATOR, NEBRASKA GASOHOL COMMITTEE

Mr. SNELLER. Thank you Congressman. I want to try and narrow this perspective somewhat if I could. Many of the comments today have been presented from a much broader basis; that is why the Federal Government is justified in continuing an exemption that will stimulate this new agri-industry.

In 1971, the Nebraska Legislature went through many of these same deliberations and at that time created the Nebraska Gasohol Committee which was set up expressly for the purpose of assisting private industry in developing grain alcohol production facilities in the State.

Public policy has continued since that time to encourage development of this industry in the State. Legislative statute sets forth the reasons for their policy. The legislature found that Nebraska should immediately initiate such a program because it provided for expanded use of agricultural products; because it was an efficient and less polluting energy source, which decreases Nebraska's dependence on imported petroleum while retaining dollars within Nebraska's economy.

It increases the value of grain through processing, and it develops a stable domestic market for grain in an agricultural producing State like Nebraska. These are obviously very crucial for the economic well-being of our economy.

Recent studies of the ethanol industry, including those by the Center for Strategic and International Studies and the U.S. General Accounting Office have examined these same issues from a national perspective. While this information has been particularly useful to Members of Congress and others who formulate Federal policy, State lawmakers are generally more interested in the impact of these issues on the State and local level, as Mr. Doyle previously pointed out, because they must deal with these from a budgetary standpoint also.

In an effort to provide some quantifiable information to policymakers in the State of Nebraska, the Gasohol Committee and the Nebraska Energy Office commissioned two studies recently. I have submitted those for the record because they are rather lengthy. The studies are economic assessments of several projects within the State of Nebraska. The studies quantify the economic impact these thanol projects will bring to the State when they are completed.

Generally, they conclude that there is a payback and while this payback may take several years, we are viewing the State tax incentive mainly in terms of an investment. This is an investment in a new industry; some have referred to it previously as a revenue loss, but we tend to look at it as an investment in Nebraska's economy.

So far, as Mr. Doyle pointed out, about $19 million has been invested in this new industry in the State of Nebraska. To date, that has generated about $35 million in new investments in ethanol plants in the State of Nebraska and we expect that investment to increase in the very near future.

So, while the payback to this revenue is of a longer term, these quantifiable studies demonstrate there is a payback. There is clearly a revenue offset but the problem, to which several speakers have alluded, is that the payback is not directly to the highway trust fund. This remains a dilemma in the Midwestern States such as Nebraska which need both good roads and a healthy agricultural economy.

Hopefully, there can be a meeting of the minds on this issue. As I understand, several pieces of legislation have been proposed that would address this question specifically as far as reimbursement to the highway trust fund.

In conclusion, public policy in the State of Nebraska has been to encourage this industry; I expect this policy to be continued. We see very clearly that these plants create employment opportunities, particularly in rural areas. As you know, Congressman, this is something many of our industrial development groups, whether they be on State level or local level, are trying desperately to accomplish: attracting new types of industry to their rural areas. Agriprocessing industries such as the grain alcohol industry can create employment; it can slow the out-migration of people away from the farming community; it can broaden and will broaden the tax base within the State, and will provide a significant boost to the area economy.

I think that while the State would like to continue the current incentives, I don't know how long we can continue, due to pressure on the Highway Trust Fund. This is an issue that was addressed in the Nebraska Legislature last year; the legislature sent the signal that they would retain the nickel exemption that we have now. I suspect in this next session there will be a reduction of the incentive and that it will be commensurate with the increase in the Federal incentive. Of critical importance is the need for consistency in public policy, as many of the speakers have alluded to today.

This is the dilemma facing financiers who are looking at potential investments in this industry. They need clear and consistent signals from Congress. You folks have done a lot toward that end, and hopefully you will continue because these objectives meet not only the needs within States like Nebraska, but clearly meet objectives of national policy, such as reductions in agricultural payments for different programs and the domestic agricultural policy. National security implications also have been alluded to in recent studies and the environmental impact as you talked about from the EPA studies is clearly one of national concern. Thank you again for your perseverance today, and I appreciate the opportunity to present these comments to you.

[The prepared statement follows:]

STATEMENT OF TODD C. SNELLER, ADMINISTRATOR, NEBRASKA GASOHOL COMMITTEE

The Nebraska Gasohol Committee was established in 1971 by the Nebraska Legislature to assist private industry in developing grain alcohol production facilities. Public policy encourages development of this industry in Nebraska because of the following legislative findings which are set forth in Nebraska statutes. The legislature finds that Nebraska should immediately initiate a Gasohol development program to provide for:

(1) Expanded use of agricultural products, (2) An efficient and less polluting energy source which decreases Nebraska's dependence on imported petroleum and retains dollars in Nebraska's economy; (3) Increased value to grain through processing; and, (4) Development of stable domestic demand for grain.

Recent studies of the fuel ethanol industry, including those by the Center for Strategic and International Studies & the U.S. General Accounting Office, have examined these issues from a national perspective. While this information has been particularly useful to Members of Congress and others who formulate federal policy, state lawmakers are generally more interested in the impact of these issues on the state and local level.

In an effort to provide members of the Nebraska Legislature with quantifiable information about the economic impact of a fuel ethanol industry in Nebraska, the Nebraska Gasohol Committee and the Nebraska Energy Office commissioned a study of this industry. This study, completed in September 1983, is an analysis of the economic impact of three ethanol plants proposed for sites in Nebraska. These three plants, when fully operational, would produce a total of 50 million gallons of ethanol annually. The construction of these plants would generate up to 1,500 new jobs and up to 400 people would be employed at the three plants when they become operational. In addition to these direct jobs, other jobs will be indirectly generated in the agriculture, transportation, utility, service and government sectors.

Plant construction will generate about $90 million in state personal income and more than $4 million in state tax revenues annually. When the plants begin operation, the state level of economic activity will rise by a minimum of $200 million and may rise by up to $400 million. This increased economic activity will also generate more than $2 million in local property and sales tax revenues annually.

The plants will combine to produce over 50 million gallons of ethanol per year for use in motor fuels. In addition, industrial carbon dioxide and distillers grains will be produced and sold. The plants will consume 20 million bushels of corn each year. The current value of the corn to be utilized in the plants is approximately $61 million but the value of the corn, when processed into ethanol and byproducts, will exceed $133 million. This industry clearly increases net income to farmers and generates a major gain in the state's balance of trade.

A more localized study of the economic impacts of an ethanol project was completed by the research division of Nebraska Public Power District (NPPD) in March (1984). This study is an economic assessment of Agri-Food and Fuel Cooperatives' proposed 30 million gallon per year ethanol plant in southeast Nebraska. The analysis by NPPD focuses on the economic effects of the proposed plant during the operation phase of the project. During the operation of the plant, an estimated 101 people will be employed with an annual payroll of $2.4 million (1983 dollars). In addition to the plant payroll, the use of more than 12 million bushels of grain annually by the plant will have a significant economic impact on the area. This is an especially important factor considering the counties near the plant are reliant on agriculture and agriculturally related activities. Technological developments in agriculture during recent years have led to increased mechanization and a subsequent decline in farm labor requirements. As a consequence of these developments, the area's history has exhibited economic trends characteristic of many agricultural areas: population decline, per capita income generally below state and nationwide averages, fluctuations in total area income and a decline in employment opportunities.

Because agriculture is the dominant sector in the economy of the study area, the economy has been one of year-to-year fluctuations and stagnant growth. Consequently, a plant that creates employment opportunities in this area, that stimulates grain demand and generates increased net farm income, that contributes to the tax base of the area and that adds value to grain products, will be a significant boost to the area. Fuel ethanol plants can play an important role in the rural economy by increasing per capita income, offering employment opportunities in rural areas, slowing the migration of people away from rural areas and stimulating a weak rural economy. Clearly, the ethanol industry can be a major economic development opportunity in many agriculturally oriented states such as Nebraska.

Copies of the aforementioned studies are submitted for the record. Thank you.

FUEL ETHANOL PRODUCTION IN NEBRASKA: AN ECONOMIC IMPACT ANALYSIS

Merrill E. Warkentin
Economics Researcher and Consultant

Prepared for the
Nebraska Gasohol Committee
Under Contract No. 60-34

September 1983

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Warkentin, Merrill E. Fuel Ethanol in Nebraska: An Economic Impact Analysis. Prepared for the Nebraska Energy Office and Nebraska Gasohol Committee, Lincoln, Ne. September 1983.

I. Executive Summary

Introduction and Objectives

The impact analysis of the proposed fuel ethanol industry in Nebraska was prepared under contract for the Nebraska Gasohol Committee and the Nebraska Energy Office. The specific objectives of the study are to assess and report the expected quantifiable economic impact of three industrial-scale, fuel-grade ethanol facilities which are proposed for construction in the near future. It is not the author's intent to conduct a feasibility study nor to investigate the non-economic impacts of these plants.

Details of the study's scope, methodology, and technical specifications can be found in later chapters of the report.

Construction Impacts/Operation Impacts

The report will divorce the impacts which will be generated by the construction of these facilities from those which will result from the perpetual operation and maintenance of the plants following completion.

Overall Economic Impacts

The construction operation of fuel-grade ethanol facilities in Nebraska will have various positive net impacts on the state's economic condition. These include increases in the level of economic activity, employment, personal income, and tax revenues. In addition, the production of ethanol from Nebraska-produced grain will allow the state to capture the value added by manufacture which will generate significant primary and secondary economic activity. The improvement in the state's balance of trade will generally contribute to the health of Nebraska's economy. Finally, an instate supply of combustible fuel, provided there will be contingency distribution arrangements, could allow Nebraska to buffer itself from the economic impacts of future petroleum supply disruptions.

Level of Economic Activity

The construction of three proposed plants which will collectively produce fifty million gallons of anhydrous ethanol annually by 1986 will have several significant impacts on this state's economy. These plants' capital costs will be about $140 million, which will be spent over the construction phase of 18-24 months for each plant. A portion of the construction expenditure will leave the state for purchase of certain production equipment. But a significant amount -- up to $100 million -- may be spent within the state. This capital expenditure will be directed to local construction companies (and their employees, suppliers, etc.), Nebraska manufacturers of liquid storage tanks and other required equipment, and other suppliers of building materials, peripheral equipment, and structural elements.

When the plants become operational, they will generate an increase in the state's economic activity level of at least $192 million. State personal income will increase by about $90 million. The communities in which the plants are located will especially benefit from increased economic activity as the payroll is spent locally for goods and services. But major effects will also occur at the aggregate level throughout the state. Beneficiaries include farmers and agricultural employees, manufacturing employees (both within and outside the ethanol industry), transportation workers, local service employees (such as sales clerks, teachers, mechanics, and public servants), and employees of the service sector statewide.

Agricultural Impacts

The demand for twenty million additional bushels of corn will be created at the regional level. This stable and dependable market for Nebraska grain will bring positive net benefits to Nebraska's agricultural community. The increased demand will produce additional income for farmers themselves, for other agricultural employees, and for persons employed in providing the necessary machinery and supplies to farmers. The increased demand for corn may also induce small increases in corn prices.

While regional corn prices may increase slightly, soybean prices may be slightly depressed as a result of the increased availability of distillers dried grains (with solubles) as a feedstock. DDGS will be substituted for soybean meal in some cases. The long run market solution will probably include a small shift from soybean production to corn production as supply reponds to shifting demand conditions.

Employment Impacts

The construction of these facilities will directly employ 1,000 to 1,250 man-years of labor and will create a total employment impact of more than 1,500 jobs. Some of the indirectly-generated jobs are in the construction-related industries discussed above in the section entitled Level of Economic Activity. Expenditures by employees in construction and related activities will induce further employment gains. A small number of the jobs created through the indirect employment impact of construction will continue to exist after the construction phase is completed.

When the plants begin operations, they will collectively employ 200 to 400 persons. These positions will be in production, materials handling, maintenance, quality control, guards, clerks and inventory control, secretarial activities, chemists and technicians, sales, and management. The plants' expenditures for corn, energy, and other inputs -- combined with the consumption expenditures of the employees -- will provide the basis for new employment in a variety of agricultural, manufacturing, and, especially, service-related industries. A total of up to 1,500 permanent new jobs will be generated by the direct and indirect impacts of ethanol plant operations.

Tax Revenue Impacts

The construction of the proposed ethanol facilities in Nebraska will have a beneficial impact on the state's fiscal status. The increase in total state tax revenues from the actual construction and from the associated activities will be in excess of $4 million over the construction period. This amount includes state personal income taxes, state corporate taxes, and state sales taxes. In addition, there will be tax benefits to the local communities and to the federal government.

The perpetual operation of the proposed facilities will also provide substantial tax revenues for the state and for the communities where the plants will locate. The annual Nebraska state income tax revenue will increase by $2.11 million, the state sales tax revenue by $1.53 million, and the state corporate tax revenue by $0.54 million, for a total annual increase of $4.18 million for the state of Nebraska. Local communities may realize an increase of up to two million dollars in local property tax revenues -- plus increases in the local sales taxes collected.

Other Impacts

In addition to the relatively straightforward impacts on the state's economic activity level, employment, and fiscal status, there will be some major, far-reaching, long-term impacts on the state's economy which are difficult to quantify.

The transformation of the agricultural commodity, corn, into the manufactured good, ethanol, in this state will allow Nebraska to capture the value added by manufacture and the consequential indirect economic expansion.

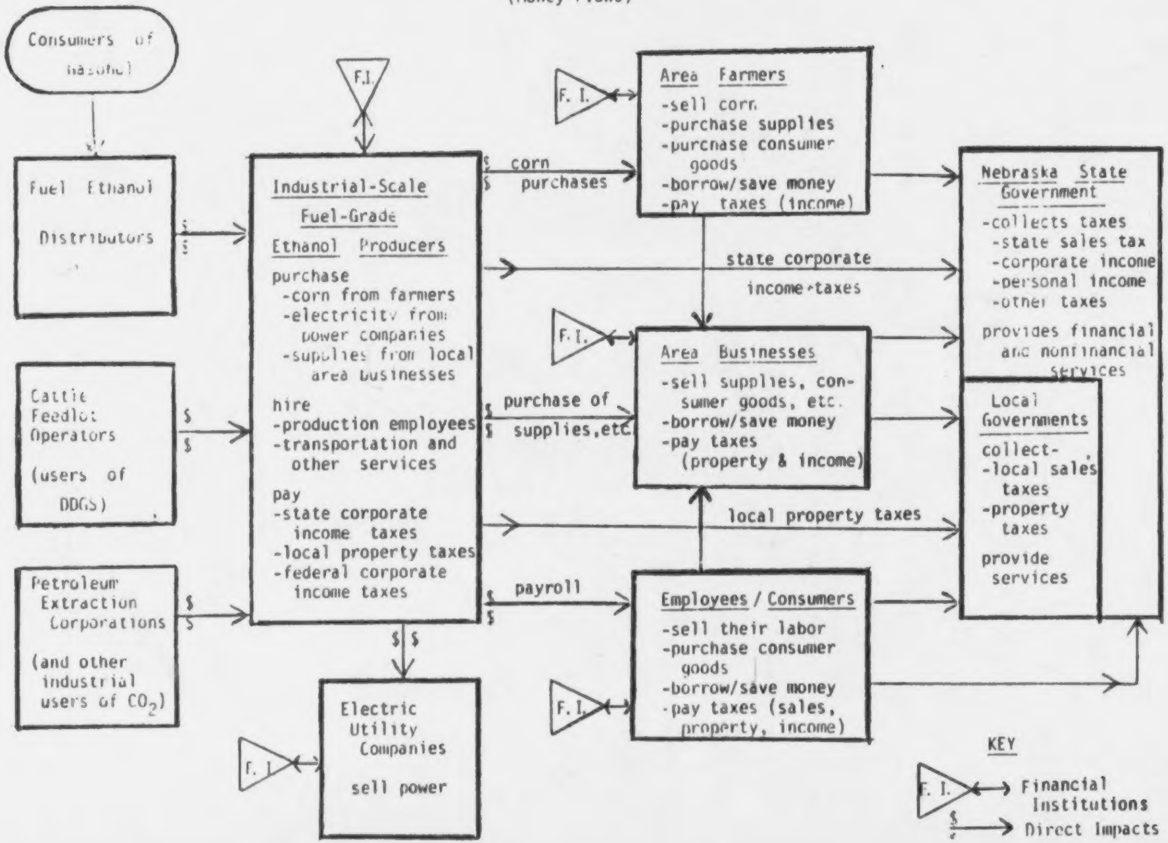
The positive impact on Nebraska's balance of trade also has the potential for extensive long-range improvement in Nebraska's economic well-being.

As employees and indirect beneficiaries of this new industry deposit a portion of their earnings into Nebraska's financial institutions, the state's credit base will increase. This can generate long-term growth as the banks extend business loans, installment loans for consumer durables and housing, and other customer loans for home improvement, education, etc.

Figure I.1

ECONOMIC IMPACT DIAGRAM

(Money Flows)


Consumers of gasohol
Fuel Ethanol Distributors
Cattle Feedlot Operators (users of DDGS)
Petroleum Extraction Corporations (and other industrial users of CO_2)
F.I.
Industrial-Scale Fuel-Grade Ethanol Producers
purchase
-corn from farmers
-electricity from power companies
-supplies from local area businesses
hire
-production employees
-transportation and other services
pay
-state corporate income taxes
-local property taxes
-federal corporate income taxes
$ $
Electric Utility Companies
sell power
$ corn purchases
state corporate income taxes
$ purchase of supplies, etc.
local property taxes
$ payroll
Area Farmers
-sell corn
-purchase supplies
-purchase consumer goods
-borrow/save money
-pay taxes (income)
Area Businesses
-sell supplies, consumer goods, etc.
-borrow/save money
-pay taxes (property & income)
Employees / Consumers
-sell their labor
-purchase consumer goods
-borrow/save money
-pay taxes (sales, property, income)
Nebraska State Government
-collects taxes
-state sales tax
-corporate income
-personal income
-other taxes
provides financial and nonfinancial services
Local Governments
collect-
-local sales taxes
-property taxes
provide services
KEY
F.I. Financial Institutions
$ Direct Impacts

II. Introduction and Scope

This report was prepared for the Nebraska Gasohol Committee in cooperation with the Nebraska Energy Office under Contract No. 60-34. It is an economic impact analysis of the ethanol facilities proposed for Nebraska. The study is not designed to assess the economic and managerial feasibility of the proposed plants, nor can it ascertain the desirability of these plants to the people and policy makers of the state of Nebraska.

The purpose of this study is solely to investigate the economic impacts of three ethanol facilities proposed for the state of Nebraska. A careful delineation of the impacts under consideration is warranted.

The general overall scope of the study will be outlined first, and specific details will follow. The two most important determinants of the economic impacts from ethanol production are the time frame and the industry size.

It is not possible to accurately project the extent to which the ethanol industry will develop in Nebraska. Furthermore, the economic impact of such an industry will substantially depend upon the mix of plant sizes and the locations of these plants within the state. Prognostication of these factors is also not feasible.

However, any analysis of future events must be based on a set of plausible assumptions. Total economic impact is a function of the above variables and many others. Because the biggest single influence on the state's economy will no doubt be the industry size, this factor shall be explored first.

The author was commissioned to study the impacts of a Nebraska ethanol industry with a 50 million gallon per year production capacity since this is the best estimate of the outcome of likely future events. Currently, at least three groups are planning construction of industrial scale, fuel-grade, ethanol-from-corn plants in the state of Nebraska. These are the announced intentions of incorporated firms which have purchased industrial sites and have contracted engineering firms for the design of the plants.

The largest of these will be the proposed Agri Food and Fuel Cooperative, Inc. operation in Benkelman (Dundy County). The A.F.F.C., headquartered in St. Francis, Kansas, may begin construction of its plant in 1984. This plant will have the capacity to produce thirty million gallons of ethanol per year. This plant's output could help satisfy the growing demand for ethanol in the Denver area market.

Another plant will be built by the American Development Corporation (A.D.C.) of Los Angeles. This facility will produce ten million gallons of ethanol annually in the Hastings area (Adams County). Groundbreaking for this plant was September 16, 1983, and construction will proceed during 1983 and 1984. Data released by A.D.C. will be presented in subsequent sections of this document.

Finally, a third plant is planned for Lincoln (Lancaster County). This will be built by the Nebraska Alcohol Fuels Corporation (NAFCO) of Lincoln, Nebraska and will also be capable of producing about ten million gallons of ethanol per year. Details of this operation are also contained elsewhere in this report.

The realization of these plans will establish a major new industry in the state of Nebraska. The value of output of such an industry will be approximately $133,975,000 (see Appendix V.A).

The second major determinant of impact is the time frame. The appropriate time frame for a study of this type must necessarily be short- to medium-range. The potential variables in a truly long-range analysis are both numerous and highly volatile and can be predicted only with a significant degree of inaccuracy. Any attempt to project the Nebraska agricultural sector's condition or American fuel consumption in 2010 A.D. would be largely conjecture. This study focuses on the next several years, then, and on 1986 in particular. Based on the construction plans of two companies discussed above, it would appear that Nebraska will have its first major ethanol plants operating by 1985.

Other inquiries have been made by organizations interested in construction of ethanol facilities in this state. Given the ethanol industry's growth potential and Nebraska's comparative advantage for this industry, the most probable baseline predictions would be that these three concerns and/or others will begin operation of such plants by the end of 1986 and very likely sooner.

Succinctly stated, then, this study projects the major economic impacts _on Nebraska_ of plants which will produce a total of 50 million gallons of fuel-grade ethanol _in Nebraska_ in 1986.

Clearly, the impacts from the plants' construction must be separated from the impacts of the continuous operation of the facilities. The two activities are fundamentally distinct and must be divorced with respect to their economic characteristics and, thus, their ultimate economic impacts. For each impact area (employment, tax revenues, etc.), there will be a discussion of the impacts generated by the construction phase--followed by an account of the effects which the ongoing operation of the plants will have on Nebraska.

Further clarification of the scope is required. "Economic impacts" include changes in employment, in state imports and exports, in 'level of economic activity,' in personal income, and in tax revenues at both the state and local levels.

It is not this author's intent to detail all of the impacts which construction and operation of fuel ethanol-producing plants would have on Nebraska. One of the noneconomic impacts which will not be investigated is the social impact which modern new plants can have on community pride. Psychological effects might stem from new plants also. There may be a drop in anxiety levels associated with new employment. The sense of security can be enhanced by such employment. A study of 31 years of fluctuating unemployment rates was conducted and published by the United States Congress. It found that every one percentage point increase in the national unemployment rate (e.g., from 8% to 9%) was associated with a 4.1% increase in suicides; a 3.4% increase in admissions to state mental institutions; a 4.0% rise in prison admissions; a 5.7% increase in homicides; and a 2.0% rise in the overall death rate.[1] These are aggregate values, so individual regions or communities may experience somewhat higher or lower changes. Yet, a small fraction of these values would be associated with unemployment changes (increases or decreases as in the case of new employment in ethanol plants) at the local level in Nebraska. Other psychological and sociocultural changes would transpire as a result of the operation of ethanol plants in Nebraska.

Environmental impacts will occur when any manufacturing plant is constructed and operated in any given location. Ecological impacts are also outside this report's scope.

In addition, the reader must note that various economic factors are also excluded from the report. Specific restrictions and constraints precluded detailed investigations into local impacts, substitution effects, long-term economic viability, traffic/transportation impacts, and other important areas of concern. To explore the myriad of alterations of marketing channels or in transportation networks would not be feasible.

Though details of employment impacts and tax revenue impacts are presented, these areas are largely treated as aggregates, and intensive research into individual changes is not attempted. (A generalized breakdown of employment impacts is presented in Section IV.)

Finally, no attempt to employ industrial location analysis is made. It is not the author's intent to predict or recommend the exact location(s) of these plants. It is assumed that enterprises which will invest in construction of such plants will determine these plants' location and size on the basis of resource availability, market characteristics, transportation factors, and overall profitability.

Additional details of the study's scope are presented in the Methodology portion of section IX. These include clarification of the study area, the economic sectors, the taxes involved, and the limitations.

Further investigation of these and other impacts is warranted. Updated (and follow-up) impact assessment of the ethanol plants will also be needed. It is hoped that this study will stimulate more research into a subject for which abundant opportunities for further emperical observation and hypothesis formation exist.

III. Economic Activity Level Impacts

The term "level of economic activity" is not clearly defined; it is not a technical term in the profession of economics. Economic activities involve the decisions of what and how much to produce and consume; how to allocate and distribute goods and services; and the actual production and consumption processes. Impact analysts usually mean "dollar amount of all transactions" when they use the phrase "level of economic activity." In a market economy in which most goods and services are bought and sold, the sum of the outputs of each sector equals the total dollar amount of all transactions. Therefore, the gross output is really a measure of transactions or sales.

Use of Multipliers

The gross output multiplier in the total requirements table signifies the change in transactions associated with each $1.00 increase in output for that sector. Appendix IX.C shows the total requirements column for this study's surrogate sector: grain milling. The gross output multiplier for this sector is 3.003949. This is correctly translated as signifying that, for every $1 increase in output for the grain milling sector, a $3 increase in all transactions will result--including the original sale of the $1 value of output from the grain milling sector. (Note the value of 1.070311 for Sector #19 itself; some feedback occurs.) Not all of the transactions will be sales to final demand; some of the transactions are sales of intermediate equipment from producers outside Nebraska will obviously not impact the state as will purchase of "brick and mortar" or the employment of Nebraska construction workers.

A useful heuristic for determining the capital construction costs of ethanol facilities is "2-1/2"--or the cost of construction will be 2-1/2 to 3 times the number of gallons of annual capacity. For example, the plant which will be built in Hastings by the American Development Corporation of Los Angeles will have an annual capacity of ten million gallons of output; its plans call for $27 million in construction costs. The NAFCO plant in Lincoln is expected to require an expenditure of $26.5 million for plant and equipment.[4] The AFFC plant in Benkelman, designed to produce 30 million gallons annually, is scheduled to cost "in the neighborhood of $85 million to get into operation."[5] The sum of the scheduled capital costs for the three plants is about $140 million. This spending may be spread over 1-1/2 to 3 years. Because a portion of this expenditure is for purchase of imported, specialized, production equipment, the appropriate figure to use for impact analysis purposes is somewhat smaller, perhaps less than $100 million.

Construction Impacts

The change in economic activity level associated with an increase in construction expenditures would be 3.084743 times the original investment. If $30 million dollars per year were spent, the increase in total transactions would be about $90 million annually.

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9

$30 million x 3.084743 = $92,542,290

The increase in state personal income would be about $28.5 million (see Table V.1).

$30 million x 0.951134 = $28,534,050

If $30 million were to be spent annually for three years to construct the ethanol plants, the total increase in transactions might be about $270 million, and the total increase in personal income might be about $86 million over the construction period.

The precise amount of these figures will be largely contingent on the proportion of construction expenditures which remains within the state. Should the engineering and construction firms purchase a larger share of non-Nebraska produced construction materials, the impact would be comparatively smaller. Conservative estimates of the transactions impact and the personal income impact of the construction activities would be somewhat less than $200 million and $60 million, respectively.

Given the constraints of this investigation and the lack of precise information concerning the sources of construction materials, an accurate forecast of the construction activity's economic level impact is not possible.

Operation Impacts

Use of gross output multipliers, as explained above, involves a certain degree of 'double counting.' The total level of economic activity, measured by summing all transactions, exceeds the gross regional product, which is the value of all final goods and services newly produced in the state in one year.

To determine the impact which the proposed facilities will have on Nebraska's economic level, annual value of output is multiplied by the gross output multiplier. The annual value of output (ethanol, distiller's dried grains, and CO_2) is estimated to be almost $134 million (see Appendix V.A). The gross output multiplier for sector #19, grain products, is 3.003949. Therefore, the total increase in transactions in one year is estimated to exceed $400 million.

$133,975,000 x 3.003943 = $402,454,067

This is the expected value of all new transactions which shall result from (and include) the new production and sale of ethanol and its byproducts. This is a gross figure which includes some 'substitution effect.' Though ethanol production will be new to the state, not all the indirect economic activities (and thus transactions) will be entirely new.

A number of farmers may shift their production from other crops to corn. Some shippers may transfer their trucking activities from gasoline to ethanol. The activities of firms engaged in refining and auxiliary activities (including distribution) may be particularly subject to 'substitution effect.' Finally, the expected increases in retail trade transactions are also largely shifts in sales from one group of products to another. (For example, retail sale of ethanol is not an entirely new economic activity; it represents a change from pumping unleaded gasoline to 'super unleaded' with ethanol.)

Yet, the "Retail Trade" row in the Grain Mills' total requirements table has a value of only 0.103582, indicating that, for each $100 in additional grain mill output, $10.36 of new retail trade will be generated (out of a total economic impact of over $300). So, although the retail trade increase is probably overstated, it does not represent a significant portion of the total impact of the ethanol plants.

In an extensive report prepared by Resource Planning Associates, Inc. (R.P.A.), entitled Analysis of Impacts of Ethanol Production in 48 States, the authors concluded that the impact on Nebraska's economic activity of one 50 million gallon-per-year plant would be about $192 million.

The methodology employed in that study was somewhat different from this author's.

> "Impacts on economic activity were estimated using state average industry-specific gross output multipliers developed by the Bureau of Economic Analysis (BEA). The principal sectors affected by ethanol production and sale are Sector 5 (food, feed grains, and grass seeds) and Sector 42 (chemicals and allied products). The value of materials imported into a state are subtracted so as to account only for the value added within the state for each sector."[6]

RPA assumed that one plant would produce the entire output of 50 million gallons. In Nebraska's case, this volume of output is projected for three plants, resulting in greater overall employment and, thus, in greater overall impact on the state's economic activity level.

The researchers also assumed that the CO_2 byproduct would be vented, not sold to industrial users as is the plan of Nebraska's producers. This omission would cause an underestimation of the impacts. The researchers also examined sectors different from those considered by this author. The result is the more conservative figure ($192 million) reported in this study's executive summary.

Clearly, the actual annual impact on Nebraska's economic activity level will fall between $192 million and $402 million.

State Personal Income Impacts

As Table V.1 demonstrates, the change in state personal income (ΔSPI) expected to result from the construction activities is contingent on the expenditure amount. Total capital construction costs will exceed $140 million, but the characteristics of this spending differ somewhat from most construction operations. Because a portion of this expenditure is targeted for purchase of specialized distillery equipment (imported into Nebraska), the net 'real' construction costs may be less than $100 million. Thus, the total (direct and indirect) personal income impact of plant construction is expected to be less than $90 million. This increase will occur over the entire construction phase.

Operation of the ethanol plants will have a sustained impact on state personal income. The household coefficient in the total requirements table for sector #19 suggests that, for each $1 of output (in the grain mill industry), about 68 cents worth of labor will be employed (see Appendix IX.C). This is the total income impact of all direct, indirect, and induced economic activities.

Therefore, annual increases of about $90 million in Nebraska personal incomes are to be expected.

$$\$133{,}975{,}000 \times 0.677905 = \$90{,}822{,}322$$

This is the upper limit of the impact, because a small portion of this income is redirected. However, the 'substitution effect' is not great for this sector, as explained in Section IX; therefore, the estimate of $90 million cannot be substantially inaccurate.

Table III.1

Increase in State Economic Activity from Ethanol Production and Sale ($ millions)

Sector 5 (food, feed grains, and grass seed)	Nebraska
Corn	65.0
Fertilizer	(6.7)
Sum	58.3
Multiplier	1.8
Total Sector 5	104.9
Sector 42 (chemicals and allied products)	
Ethanol	90.5
DDG	33.3
Ammonium Sulfate	0.6
Corn	(65.0)
Coal	(2.5)
Ammonia	(0.6)
Denaturant	(0.6)
Yeast	(0.4)
Electricity	2.5
Sum	57.8
Multiplier	1.5
Total Sector 42	86.7
Annualized Increase in Economic Activity	191.6

Source: U.S. Department of Energy, Office of Alcohol Fuels. Analysis of Impacts of Ethanol Production in 48 States, Prepared by Resource Planning Associates, Inc., September 1981, Figure 2.5.

IV. Employment Impacts

This section outlines the magnitude and characteristics of employment generated by the construction and operation of the ethanol plants. For a discussion of the impacts on state personal income levels, see State Personal Income Impacts in section III.

Construction Impacts

During the construction phase, new jobs will be created in the construction industry directly and indirectly as a result of increased demand for both construction materials and for goods and services purchased by the new employees. At least 1,000 man-years of employment will be required to build the plants. Though 1,000 to 1,200 man-years will be required, the construction will occur over an eighteen-month to two-year time span. Therefore, somewhat fewer construction workers--possibly 600 to 700, on the average--may be required.

For example, Bob Mehta, Senior Vice President of American Development Corporation, estimates that about 90 to 100 individuals will be employed during the 24-month construction period, on the average. This represents about 200 man-years of labor. Certainly, more than 100 workers will receive income from this project. Many specialized tasks must be performed; this creates the need for temporary employment of many individuals in areas such as earth moving, cement pouring, electrical wiring, welding, roofing, and landscape finishing.

In addition to the direct requirement of construction workers, a certain number of indirect employment impacts will result. Many of these impacts will be felt outside the state since Nebraska is unable to supply all of the materials needed for ethanol plant construction. Of the $27 million required to build a 10.5 million gallon-capacity plant, $11.5 million must be spent on specialized equipment such as hydrolysis, fermentation, and evaporation equipment.[7] Although some of this equipment is manufactured in Nebraska, much is not. Therefore, the related employment impacts will occur in areas where the equipment is produced.

Many of the direct construction jobs will be filled by Nebraskans, as will some of the indirect jobs. Professional engineering services can partially be supplied by native engineering firms. Impacts on wholesale and retail trade as supplies are purchased and as the employees purchase consumer durable and nondurable goods will be felt within this state.

Appendix IV.A shows results of a study conducted by Employment Research Associates. The study investigated the employment impacts in the United States from a $12 billion investment in ethanol plant construction. (This was the size of investment required to built a number of plants with a combined capacity of 6 billion gallons per year.)

Appendix IV.B has two columns of figures. The figures in the first column are simple percentages (0.833%) of those in Appendix IV.A. These would be the number of jobs expected to be created by a $100 million investment in ethanol plant construction. (Note that the 'constant returns scale' assumption need not be made here, only the assumption that the plant size and mix be roughly the same in this state's fraction as in the nationwide program.) The numbers in the second column are somewhat smaller, reflecting the open economy of Nebraska. In a national study region, all or nearly all the induced jobs would be filled by the population within the study region. However, when considering a smaller area, not all the jobs would be within that region. Nebraska would not be in a position to satisfy job requirements in most heavy industries, in some equipment manufacture, or in logging and wood products. Thus, the sum of figures in the second column shows that the employment impact of the ethanol plant construction in Nebraska would be considerably smaller than in other larger, more self-sustaining state economies.

The total nondirect employment impact will be between 293 and 762 jobs, according to figures extrapolated from the national Employment Research Associates study. The total new jobs during construction might be about 1,300 to 2,100, according to this approach. Other studies report similar findings, and it might conservatively be assumed that about 1,500 man-years will be required for construction of these plants and for the other generated economic activity.

Construction, of course, generates temporary direct impacts. Once the projects are completed, the flow of income to the construction workers (the payroll) will cease. The income generated from purchases of local supplies for construction and from local spending by the construction workers will also be temporal, although the ripple effects may leave the local community a little better off after construction, due to any investment and employment which may occur in response to increased demand. The higher levels of demand will be viewed as temporary, and investment and employment decisions are made accordingly. For example, if a nuclear power plant or a hydroelectric dam was to be built over an eight- to twelve-year period, the future income of a local business (discounted to the present) would be considerably greater than would the income received from an 18-month construction operation. Therefore, the higher (present value of future) income might justify the investment of opening a local motel or restaurant and the employment of staff. In either case, however, substantial impact will result from the economic activities of construction and those activities generated by that construction.

Operation Impacts

Whereas the employment impacts generated by construction are clearly quite transitory, employment generated by the steady production of ethanol will be very stable. Again, there will be the direct impacts at the plant and many indirect and induced jobs, as a result. It should be noted that there may be a short delay between the initial increased demand (from the direct employment (and income)) and the induced hiring of other employees to satisfy this new level of aggregate demand. It is assumed that these impacts are all realized within 1986.

The number of persons required to operate the plants depends on several factors, including technology utilized, number of shifts of operation, and degree of local administrative support. Considerable variation in technology produces a range of employment needs. Operating three shifts at levels far below capacity would employ many more persons than operating one shift at full capacity. A plant supported by a local, on-site staff of technical, clerical, managerial, and administrative personnel will definitely employ more local persons than a plant supported by absentee personnel. (A portion of the total direct employment impact would be realized outside the state, in the latter case, as would that portion of impact induced by expenditures by the absentee support staff.)

Appendix IV.C shows the number and classification of jobs required to operate, maintain, and supply the ethanol plants. Again, the national figures are percentages (0.833%) of the results of the larger investment, whereas the Nebraska figures are estimates of the Nebraskans to be employed by these plants as well as by various direct suppliers. This evidence suggests that between 320 and 460 additional persons will be employed by the production, transportation, and supplying sectors of Nebraska's economy. These figures do not include all the jobs generated by the increased expenditures by the plant's operators. Nor do they include other indirect and induced jobs.

Appendices IV.D through IV.G show the types of employment required to manage, operate, and support three different scales of ethanol production. Using the figures estimated for the 10 million gallon capacity plants--and using extrapolated figures for the 30 million gallon plant--the estimate of direct employment impacts is about 315 jobs. However, some of the administrative and marketing activities will be performed in corporate headquarters outside Nebraska. Thus, the effective change in absolute employment, as a direct result of the operation of Nebraska ethanol facilities, is expected to be 275.

Finally, another estimate of the direct employment requirements can be made by studying the production employment plans of the companies which will operate ethanol facilities in Nebraska.

Bob Mehta of A.D.C. estimates that his company's 10 million gallon capacity plant will employ 44 or 45 persons at that location. Ray Davy of NAFCO estimates that his company's plant--also scheduled to initially produce about 10 million gallons annually--will employ between 36 and 50 persons. The larger A.F.F.C. plant is scheduled to hire between 120 and 130 permanent employees. Therefore, the combined direct employment of these plants is expected to be in excess of 200 persons.

The jobs indirectly generated by the increased corporate and consumer demand will be in other processing sectors, in agriculture, and especially in the service sectors. The magnitude of this impact is a function of regional variables.

It is expected that the indirect employment impact will be more than double the direct impact at the state level. Appendix IV.H shows the total employment impacts expected from the construction of a single, 50 million gallon capacity plant in Nebraska. The number of new jobs created as a result of the state's proposed ethanol industry is expected to exceed 1,500.

Appendix IV.A

Jobs Generated with a $12 Billion National Investment in Ethanol Plant Construction

(Dry Milling)

	Number of Jobs
Construction	159,970
Fabricated Structural Metal	60,090
Miscellaneous Professional Services (Engineering)	20,550
Basic Steel and Blast Furnaces	15,930
Other Fabricated Metal Products	11,360
Wholesale Trade	8,810
Miscellaneous Business Services	7,900
Retail Trade	5,270
Service Industry Machinery	4,720
Truck Transportation	4,700
General Industry Machinery	4,270
Cement and Concrete Products	3,510
Electric Transmission Equipment	3,340
Special Industry Machinery	2,580
Electric Lighting and Wiring	2,570
New Highway Construction	2,530
Primary Aluminum and Aluminum Products	2,300
Iron and Steel Foundries and Forgings	2,060
Wooden Containers	1,880
Scientific and Controlling Instruments	1,820
Machine Shop Products	1,710
Primary Copper and Copper Products	1,190
Millwork, Plywood, and Other Wood Products	1,190
Electrical Industrial Apparatus	990
Miscellaneous Stone and Clay Products	830
Material Handling Equipment	740
Farm Machinery	650
Household Appliances	630
Typewriters and Office Equipment	520
Computers and Peripheral Equipment	450
Hotels and Lodging Places	390
Sawmills and Planning Mills	350
Electronic Components	250
Heating Apparatus and Plumbing Fixtures	240
Metal Working Machines	230
Construction, Mining, and Oilfield Machinery	210
Stone and Clay Mining	170
Logging	120
ALL OTHER	72,020
TOTAL JOB GAIN	409,000

Source: Anderson, Marion, and Carl Parisi. American Jobs from Alcohol Fuel, Employment Research Associates. Lansing, Michigan, 1981, p. 4.

Appendix IV.B

Jobs Generated with a $100 Million Investment in Ethanol Plant Construction

	USA	Nebraska
Construction	1,333	1,000-1,250
Fabricated Structural Metal	510	0-50
Miscellaneous Professional Services (Engineering)	171	75-100
Basic Steel and Blast Furnaces	133	
Other Fabricated Metal Products	95	
Wholesale Trade	73	20-40
Miscellaneous Business Services	66	20-50
Retail Trade	44	20-30
Service Industry Machinery	39	10-25
Truck Transportation	39	5-20
General Industry Machinery	36	
Cement and Concrete Products	29	10-15
Electric Transmission Equipment	28	10-20
Special Industry Machinery	22	
Electric Lighting and Wiring	21	2-5
New Highway Construction	21	10-20
Primary Aluminum and Aluminum Products	19	
Iron and Steel Foundries and Forgings	17	0-5
Wooden Containers	16	
Scientific and Controlling Instruments	15	1-5
Machine Shop Products	14	2-5
Primary Copper and Copper Products	10	
Millwork, Plywood, and Other Wood Products	10	
Electrical Industrial Apparatus	8	1-2
Miscellaneous Stone and Clay Products	7	
Material Handling Equipment	6	
Farm Machinery	5	1-2
Household Appliances	5	
Typewriters and Office Equipment	4	
Computers and Peripheral Equipment	4	
Hotels and Lodging Places	3	2
Sawmills and Planning Mills	3	
Electronic Components	2	1
Heating Apparatus and Plumbing Fixtures	2	
Metal Working Machines	2	
Construction, Mining, and Oilfield Machinery	2	
Stone and Clay Mining	1	
Logging	1	
ALL OTHER	600	100-400
TOTALS	3,407	1,290-2,124

Note: This is based on the figures presented in previous appendix. See further explanation following next appendix.

Appendix IV.C

Jobs Generated Annually from Operating, Maintaining, and Supplying the Alcohol Fuel Plants

	USA	Nebraska
Personnel for plant operations	265	220-240
Food Produces (Yeast)	3	0
Industrial, Organic and Inorganic Chemicals (Enzymes)	5	0
Truck Transportation	70	30- 60
Wholesale Trade	58	20- 50
Coal, Electricity, Gas	74	20- 30
Other	116	30- 80
TOTAL	591	320-460

Source: Anderson, Marion, and Carl Parisi, American Jobs From Alcohol Fuel, Employment Research Associates, Lansing, Michigan, 1981, p. 6.

Note: Figures in Appendix IV.C do not include "jobs generated on farms from growing and harvesting crops. Nor did we factor in any increases in the sales of farm machinery as farmers' incomes rise as their crops become more profitable." (p. 7).

The USA figures in Appendices IV.B and IV.C are simple percentages (0.833%) of projections of national employment requirements for constructing and operating a 6 billion gallon-per-year level of production. The Nebraska figures are estimates of the share of these new jobs which might be filled by Nebraskans. This figure will vary substantially depending upon both the size of the plant and the level of automation.

Appendix IV.D

Ethanol plant employment, direct labor

Item	10 million gallon			20 million gallon			40 million gallon		
	Number employees	Hourly rate	Total	Number employees	Hourly rate	Total	Number employees	Hourly rate	Total
		($)	($000)		($)	($000)		($)	($000)
1st shift	18	7.00	262	21	7.00	306	30	7.00	437
2nd shift	10	7.50	156	13	7.50	203	20	7.50	312
3rd shift	10	7.50	156	13	7.50	203	20	7.50	312
4th shift	10	7.50	156	13	7.50	203	20	7.50	312
Subtotal	48		730	60		915	90		1,373
Fringe benefits (25%)			183			229			343
TOTAL			913			1,144			1,716
Cost per gallon			.091			.057			.043

Source: DPRA estimate from --
Milton, David L., et. al. Gasohol Feasibility Study. (Prepared by Development Planning and Research Associates, Inc., Manhatten, Kansas for Energy Research and Development Center, University of Nebraska-Lincoln.) July, 1978, Appendix VI-2.

Appendix IV.E

Ethanol plant employment, indirect labor

Item	10 million gallon			20 million gallon			40 million gallon		
	Number employees	Hourly rate	Total	Number employees	Hourly rate	Total	Number employees	Hourly rate	Total
		($)	($000)		($)	($000)		($)	($000)
Guards	4	4.00	32	5	4.00	40	8	4.00	64
Maintenance	7	10.00	140	10	10.00	200	18	10.00	360
Plant manager	1	12.50	25	1	15.00	30	1	20.00	40
Assistant plant manager	0	--	--	1	10.00	20	2	12.50	50
Shift supervisors	4	10.00	80	4	10.00	80	4	10.00	80
Chemists	1	8.00	16	2	8.00	32	3	8.00	48
Technicians	6	8.00	96	10	8.00	160	14	8.00	224
Shipper	1	7.00	15	1	7.00	15	2	7.00	30
Purchasing	1	11.00	22	1	11.00	22	1	12.50	25
Plant engineer	1	11.00	22	1	11.00	22	2	12.50	50
Clerks	2	4.00	16	2	4.00	16	4	4.00	32
Subtotal	28		464	38		637	59		1,003
Fringe benefits (25%)			116			159			251
TOTAL			580			796			1,254
Cost per gallon			.058			.040			.031

Source: DPRA estimate from --
Milton, David L., et. al. Gasohol Feasibility Study. (Prepared by Development Planning and Research Associates, Inc., Manhatten, Kansas for Energy Research and Development Center, University of Nebraska-Lincoln.) July, 1978, Appendix VI-3.

Appendix IV.F

Ethanol plant employment, administrative personnel

Item	10 million gallon			20 million gallon			40 million gallon		
	Number employees	Hourly rate	Total	Number employees	Hourly rate	Total	Number employees	Hourly rate	Total
		($)	($000)		($)	($000)		($)	($000)
General manager	1	40	40	1	50	50	1	65	65
Comptroller	1	20	20	1	26	26	1	30	30
Secretaries	2	8	16	2	8	16	3	8	24
Clerks	1	8	8	2	8	16	3	8	24
Subtotal	5		84	6		108	8		143
Fringe			21			27			36
Total			105			135			179
Cost per gallon			.011			.007			.005

Source: DPRA estimate from --
Milton, David L., et. al. Gasohol Feasibility Study. (Prepared by Development Planning and Research Associates, Inc., Manhatten, Kansas for Energy Research and Development Center, University of Nebraska-Lincoln.) July, 1978, Appendix VI-4.

Appendix IV.G

Plant employment, marketing personnel

Item	10 million gallon			20 million gallon			40 million gallon		
	Number employees	Hourly rate	Total	Number employees	Hourly rate	Total	Number employees	Hourly rate	Total
		($)	($000)		($)	($000)		($)	($000)
Sales manager	1	25	25	1	30	30	1	40	40
Sales representatives	2	20	40	4	20	80	6	20	120
Secretaries	2	8	16	2	8	16	3	8	24
Clerks	1	8	8	2	8	16	3	8	24
Subtotal	6		89	9		142	13		208
Fringe benefits (25 pct)			22			36			52
Total			111			178			260
Cost per gallon			.011			.009			.006

Source: DPRA estimate from --
Milton, David L. et. al. Gasohol Feasibility Study. (Prepared by Development Planning and Research Associates, Inc., Manhatten, Kansas for Energy Research and Development Center, University of Nebraska-Lincoln.) July, 1978, Appendix VI-5.

Appendix IV.H

Change in State Employment
Due to Production and Sale of Fuel Ethanol
(Equivalent Full-Time Employment)

	Corn-Producing States		Corn-Importing States	
Direct				
Ethanol Plant Employment				
Management	25		25	
Operation & Maintenance	75		75	
Total		100		100
Transportation Employment				
Feedstocks	20		20	
By-Products	5		5	
Total		25		25
Farm Employment		640		-
Total Direct		765		125
Indirect				
Service and Related Employment		700-800		100-150
Total		1,465-1,565		225-275

Source: U.S. Department of Energy, Office of Alcohol Fuels. *Analysis of Impacts of Ethanol Production in 48 States*, Prepared by Resource Planning Associates, Inc., September 1981, Figure 2.5.

Note: This is based on *one* 50 million gallon annual capacity plant.

Appendix IV.I Employment and Earnings Generated by Production of Fuel-Grade Alcohol from Corn

Plant Size (10^6 gal/yr)	Employment (worker-years)				Earnings (10^3 1980 $)			
	Plant Operation & Maintenance	Grain[a] Prod.	Truck[b] Drivers	Total	Plant Operation & Maintenance	Grain[a] Prod.	Truck[b] Drivers	Total
1	7-14	13	0.6	20.6-27.6	51-131	56	10	117-197
2	7-14	26	1.3	34.3-41.3	51-131	112	22	185-265
3	18-20	38	1.9	57.9-59.9	131-187	168	32	331-387
4	18-20	51	2.6	71.6-73.6	131-187	224	44	399-455
5	18-20	64	3.2	85.2-87.2	131-187	280	55	466-522
10	36-41[c]	128	6.3	170.3-175.3	374-554	560	107	1,041-1,221
20	71-83	256	12.7	339.7-351.7	738-1,122	1,120	216	2,074-2,458
50	91-159	640	31.6	762.6-830.6	1,325-2,976	2,800	537	4,662-6,313

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[a] Assumes a full year's employment for a hired farm worker is completed in six or seven months and involves an average of 1250 hours. This is consistent with information reported in Bureau of Labor Statistics, *Occupational Outlook Handbook*, U.S. Government Printing Office, Washington, D.C., 1979.

[b] Assumes each driver makes three deliveries per day and separate trucks are used for grain and DDG.

[c] Because no data were available on plants in this range, these values are obtained from linear interpolation of numbers for next larger and smaller plants.

V. Tax Revenue Impacts

Construction Impacts

The construction of these plants and the resulting economic activity will combine to produce a positive net benefit upon the state's tax revenues. As stated above, the scheduled capital costs for the three plants are about $140 million. This dollar amount will be spent over several years. The tax revenue impacts of ethanol plant construction are listed in Table V.1.

It must be recognized that the methodology depends on an average of all construction activities and that ethanol plant construction requires purchase of expensive, specialized equipment. Therefore, much of the money spent on such equipment will leave the state, leaving less than $100 million to impact directly on the state of Nebraska.

A construction expenditure of $30 million in one year will generate a total tax impact of about $1.42 million (see Table V.I). This figure includes state personal income tax, corporate income tax, and sales tax. The total state tax revenues generated from construction of these facilities is expected to exceed $4 million.

Operation Impacts

The regular maintenance and operation of the new ethanol industry in Nebraska will also bring positive net tax revenue gains for the state and for the communities where the plants will locate. Annual Nebraska state income tax will increase by $2.11 million; the state sales tax by $1.53 million; and the state corporate tax by $0.54 million, for a total annual increase of $4.18 million for the state of Nebraska (see Appendix V.B).

In addition, local communities may realize an increase of up to two million dollars in local property taxes--plus increases in the local sales taxes collected.[8] (The Federal Government will also realize net gains in tax revenues due to the total impacts from the operation of these plants. It is estimated that the Federal government will realize a net increase in income taxes of $38.3 million annually, based on 20% times the projected economic activity increase of $191.6 million.[9])

Sales of motor gasoline which contains 10% ethyl alcohol are currently exempt from 5¢/gallon in state highway trust fund taxation and from 5¢/gallon in similar federal taxation. Though this incentive program decreases the level of state revenues generated, this 5¢/gallon reduction in potential highway trust fund revenues occurs whether the ethanol is imported (as is the current case) or whether it is produced in Nebraska. Therefore, the construction and operation of the proposed ethanol facilities can only impact Nebraska's highway trust fund if gasohol consumption increases as a result of the proximity of ethanol supply. The probability and magnitude of such a relationship is indeterminable.

The potential future growth in gasohol (and thus in forfeited highway trust fund revenues) is constrained by the size of the potential market. In 1982, about 90 million gallons of gasohol were sold at the pump in the state, resulting in approximately $4.5 million in unrealized revenue for the trust fund. The entire 1982 market for all gasoline sales--including unleaded, regular, and premium fuels--was 787 million gallons. It is unlikely that more than half the ethanol plants' annual output (25 million gallons ethanol = 250 million gallons gasohol) could be sold within the state. The remainder will be exported to large markets close to Nebraska. Therefore, though future sales of gasohol will continue to reduce the potential highway trust fund revenue levels, instate production will generate not only positive shifts in the state balance of trade, but also state tax revenues for Nebraska and tax revenue for several communities.

Finally, there will be an increase in motor vehicle registrations, trucker's special permit fees, and special fuel taxes on diesel as a result of the increased demand for (and operation of) truck transportation. Traffic analysis of one proposed plant indicated that somewhat less than 100 round trips per day would be required. Total transportation impacts were not assessed, so the impact on tax revenues was not determined.

Table V.1 Tax Revenue Impacts during Construction

Construction Expenditures Per Year ($ millions)	ΔSPI ($ millions)	% SPI	State Tax Increase Per Year ($ millions) Income Tax	Corporate Tax	Sales Tax	Total
10	9.511350	0.0632	0.24	0.06	0.17	0.47
20	19.022700	0.1264	0.48	0.12	0.35	0.95
30	28.534050	0.1895	0.72	0.18	0.52	1.42
40	38.045400	0.2527	0.95	0.25	0.69	1.89
50	47.556750	0.3159	1.19	0.31	0.87	2.37
60	57.068100	0.3791	1.43	0.37	1.04	2.84
70	66.579450	0.4422	1.67	0.43	1.21	3.31
80	76.090800	0.5054	1.91	0.49	1.39	3.79
90	85.602150	0.5686	2.15	0.55	1.56	4.26
100	95.113500	0.6318	2.39	0.61	1.73	4.73

Note: Totals in final column may not equal the sum of the three preceding columns, due to independent rounding.

Note: For methodology, see Appendices V.A - V.B.
The labor coefficient (Households sector) for the construction industry, taken from the total requirement table (households endogenous), is 0.951135. See pp. 15-17 for further explanation.

Appendix V.A Annual Value of Output

(for projected Nebraska ethanol industry, 1986)

Output	Quantity	Price (1983)	Annual Value
Ethanol	50 M gallons	\$1.81/gal	\$ 90,500,000
DDGS	185,000 tons	\$145/ton	\$ 26,825,000
CO_2	370 M lbs.	\$0.045/lb.	\$ 16,650,000
Total -			\$133,975,000

Source: Prices are early 1983 prices obtained from Information Resources, Inc. "Alcohol Fuels Industry Report." Washington, DC, January 21, 1983. Generally, average figures are used when a range of geographic prices are available.

For every dollar of output from this class of industry, the input-output multipliers tell us that 68 cents of new personal income will be generated within the state of Nebraska (after the indirect and induced impacts are included).

$$\$133,975,000 \times 0.677905 = \$90,822,322$$

The annual production of 50 million gallons of ethanol will create about \$91 million in new state personal income in Nebraska. This represents an increase of 0.557% over the 1981 Nebraska personal income of \$16,292 million.

Nebraska State Personal Income, SPI

1979 - - - - - - - - - - - - - - - - - -	\$13,506 million
1980 - - - - - - - - - - - - - - - - - -	\$14,361 million
1981 - - - - - - - - - - - - - - - - - -	\$16,292 million
1982 - - - - - - - - - - - - - - - - - -	\$16,939 million

Source: Regional Economic Information System, Bureau of Economic Analysis, U.S. Commerce Department, unpublished data, August 1983.

Appendix V.B Nebraska State Tax Revenue Impacts of Ethanol Plant Operation

$\Delta R_I = [(\Delta SPI) \quad (R_I \; E_{SPI})] \; [R_{I1981}]$

$= [(.00557464) \; (1.26618)] \; [298{,}347{,}172]$

$= [.00705849] \; [298{,}347{,}172]$

$= \$2{,}105{,}882$

$= \$2.11$ million

$\Delta R_S = [(\Delta SPI) \quad (R_S \; E_{SPI})] \; [R_{S1981}]$

$= [(.00557564) \; (1.02095)] \; [268{,}737{,}153]$

$= [.00569143] \; [268{,}737{,}153]$

$= \$1{,}529{,}498$

$= \$1.53$ million

$\Delta R_C = [(\Delta SPI) \quad (R_C \cdot E_{SPI})] \; [R_{C1981}]$

$= [(.005574644) \; (1.46708)] \; [66{,}184{,}290]$

$= [.00817844] \; [66{,}184{,}290]$

$= \$541{,}284$

$= \$0.54$ million

ΔR_I = annual increase in state income tax = $2.11 million
ΔR_S = annual increase in state sales tax = 1.53 million
ΔR_C = annual increase in state corporate tax = 0.54 million
Total increase in state tax revenues $4.18 million

Sources: continued on next page.

Sources (for Appendix V.B)

The labor coefficient (households sector, #45) is taken from the total requirements table within the unpublished 1977 Nebraska Input-Output Tables, Professor F. Charles Lamphear, University of Nebraska-Lincoln Economics Department (see Appendix IX.C).

The value for the change in state personal income (ΔSPI) is based on the labor coefficient of 0.677905, the annual value of output, and the 1981 SPI of $16,292 million. The 1981 SPI and revenue figures were utilized to ensure consistency with the state tax revenue elasticities for 1981. The previous Appendix demonstrates that the income generated by operation of the plants will constitute an increase of 0.557% over the 1981 income for Nebraska. (Thus ΔSPI = 0.00557464).

The values for state tax revenues--R_I1981, R_S1981, and R_C1981--are from 1981 Annual Report, Nebraska Department of Revenue, March 1983.

The revenue impact assessment methodology was employed by Professor F. Gregory Hayden, University of Nebraska-Lincoln Economics Department, in "An Analysis of the Low Income Weatherization Program's Impact on the Nebraska Economy and on State Taxes Collected," published in Nebraska Energy Futures: A Time for Choices (Nebraska Legislative Council Committee Report No. 272, supplement, January 1980, pp. 239-257).

Dr. Hayden cited the state Revenue Department for the 1981 state tax revenue elasticities; $R_I\ E_{SPI}$, $R_S\ E_{SPI}$, $R_C\ E_{SPI}$.

VI. Other Economic Impacts

Both construction and operation of ethanol facilities will produce a variety of other economic changes. On the small scale, the employment activities of many persons will change; the incomes of many local businesses will increase; the local tax bases will grow; and local credit conditions will improve. Transportation networks will be altered. These alterations will induce other economic changes.

Agricultural Impacts

A study conducted in the state of Illinois demonstrated that the large Archer Daniels Midlands plant had a considerable impact on regional and national corn prices. The authors' short-run corn price impact methodology suggests that if Nebraska's projected twenty million bushel annual demand increase was entirely new (no substitution effect), national corn prices would be expected to rise by over one cent per bushel.[10] Regional price increases may be somewhat higher. Several other studies have found even larger price effects of ethanol production's demand for corn.

While regional corn prices may increase slightly, soybean prices may be slightly depressed as a result of the availability of distillers dried grains (with solubles) as a feedstock. DDGS will be substituted for soybean meal, in some cases. The long-run market solution will probably include a small shift from soybean production to corn production as supply responds to the change in demand. However, one study concluded that soybean prices may rise.

> "Soybean prices rise in spite of a fall in meal prices because less acreage is devoted to soybeans. The fall in meal prices will be attenuated if distiller's grains and gluten meal maintain their values through exports."[11]

Balance of Trade

The state balance of trade will be affected in several ways. Domestic production may displace all ethanol imports (totalling about eight million gallons--$15 million--in 1982). In addition, the state may be able to export about $70 million worth of ethanol; $16.65 million worth of CO_2; and some of the $26.825 million annual output of DDGS. However, there may be some decline in state corn exports. The state will increase imports of certain chemicals used in the ethanol process; however, the total value of purchases of denaturant, yeast, enzymes, and other chemicals will probably not exceed a few million dollars annually.

A rough approximation, then, of the net trade impact would be in the neighborhood of $100-110 million. In other words, the increases in state exports--due to the new industry--minus the increases in imports equal about $100 million. This is a net figure, however, which excludes the import/export implications of ethanol production's indirect and induced impacts.

The increased state income from the new jobs will induce other income increases for persons serving the new employees. Part of this total new state personal income will "leave the state" as individuals purchase goods and services produced in the other 49 states and around the world. The percentage of the new income which leaves the state will determine the magnitude of the total gross impact of the trade surplus. The higher the portion that remains within the state, the larger will be the export base multiplier. The total impact on Nebraska's economy, when calculated with a conservatiave export base multiplier of 1.5-2.0, would be more than $150 million annually. (The export base multiplier is discussed in Appendix IX.B.)

Unemployment Compensation

Another area of concern to the economic impact analyst is the effect on unemployment compensation expenditures. With a total annual increase of about 1,500 jobs generated by the new industry, it can be expected that a certain number of individuals will be employed from among the ranks of the unemployed. These persons will then discontinue collecting unemployment compensation.

Initially, the jobs will be in construction and related trades. Because the construction industry continues to be somewhat depressed by last year's recession, a relatively high percentage of these jobs can be expected to be filled by previously unemployed persons. From a total of about 1,200 construction jobs (over an 18- to 24-month period), possibly as many as 50% of those employed will have been unemployed workers. Using 35% as a conservative estimate, it can be shown that 420 persons will discontinue receiving their unemployment compensation checks. When multiplied by \$96.78/week[12] and by 52 weeks/year, the result is an annual expenditure reduction of about \$2 million during the 18-24 month construction phase.

420 persons x \$96.78 per person per week x 52 weeks/year =
\$2,113,675/year savings

This figure does not take into account jobs created by the indirect and induced effects of the investment in plant and equipment capital. These may total an additional several hundred jobs, some of which will also be filled by unemployed persons.

When the plants begin operation, they will employ a minimum of 200 persons. Many of these positions will require relatively unskilled individuals as material handlers, security guards, clerical staff, and general maintenance personnel. It is estimated that more than 80% of the positions will be filled by Nebraskans[13] and as many as one-third will be unemployed at the time. "Much of NAFCO's employment requirement will be met by recruiting from minority groups whose unemployment rate is typically higher than the regional average."[14] In addition, more jobs will be created in transportation, wholesale trade, and other sectors. The total number of jobs in operating, maintaining, and supplying the plants is projected to be more than 400 jobs. If only 100 of these persons ceased collecting unemployment compensation, the state could realize a net reduction in public expenditures of about one-half million dollars.

100 persons x $95.26 per person per week x 52 weeks/year =
$495,352.00/year savings

Again, the number of new jobs created by the total impact of the plant operations, indirect impacts, and induced impacts has not been calculated. Thus, for this reason, the expenditure reduction is understated .

These figures are not intended to provide precise projections, but rather to assess the nature and relative magnitudes of potential impacts. The qualifications include the following. Unemployed persons do not remain on unemployment for 52 weeks/year. Of course, some unemployed persons will eventually become recipients of other state and federal funds, the much more costly transfer programs. Indeed, many unemployed are classified by economists as "frictionally unemployed"--'between jobs'--and some of these do not collect unemployment compensation.

On the other hand, no attempt was made to calculate the impact on other sectors--jobs created by the increased demand for industrial supplies, transportation, consumer goods, services, etc. The indirect impacts probably equal or exceed the direct employment impacts. In fact, the total increase in annual employment will probably be about 1,500 (see section IV).

Many of these new positions will be filled by unemployment compensation recipients. The public expenditure reduction figure given above may, therefore, be considered as a conservative estimate.

Future Impacts

Several economic impacts which may occur after 1986 can be identified. As state personal incomes rise, not only will consumer spending grow, savings will increase also. As employees and indirect beneficiaries of this new industry deposit a portion of their earnings into Nebraska financial institutions, the state's credit base--money available for lending--will grow. As these assets are loaned to businesses and individuals, they provide the financial resource base for other economic activity; business expansion, home construction and home improvement, consumer durable goods purchases, and so on. These actions can make important contributions to Nebrask'a state economic growth.

As economic activity levels rise, there is sometimes a need for greater public expenditures for support services. The greatest impact is usually direct. Yet one study reported that traffic analysis of one plant's operation indicated no need for increased road maintenance expenditures.

> "Nominal traffic flows surrounding the plant number less than 100 round trips per day. No plans are foreseen in which the city or county will require additional work on the road beds on expansion of road facilities to accomodate planned increased traffic for the 10 million gallon plant."[15].

Another potential economic benefit in the future is the protection against disastrous energy supply disruptions. An instate supply of combustible fuel, provided there will be contingency distribution arrangements, could allow Nebraska to insulate itself from the negative economic impacts of future petroleum supply disruptions.

Finally, the conversion of surplus government agricultural commodities into fuel-grade ethanol could assist in saving potentially hundreds of millions of dollars in taxpayer costs for commodity storage and management. In October of 1982, the President signed into law a measure authorizing the use of surplus government commodities for processing into fuel ethanol.

VII. Economic Background

Historically, Nebraska's economy has always been agriculturally-based. The first settlers farmed the prairie soil, raising a variety of crops--including corn, wheat, and hay. They also raised cattle in great numbers. Much of Nebraska's early growth resulted from growth in the agricultural sector. Omaha's importance as a transportation intersection and loading point for Nebraska's (and Iowa's) agricultural commodities was the source of gains in its employment, population, and related industries. The need for transportation throughout rural Nebraska instigated construction of an efficient, statewide railroad system, which, in turn, spurred further growth of many communities along the rail lines. The Homestead Act and statehood for Nebraska helped bring further settlement and development in the state, as did the Codex of 1871, which prompted thousands of Volga and Crimean Germans to leave Russia and settle throughout the Great Plains, including Nebraska.

Corn has always played a leading role in this agriculturally-dominated state. It "was the most important crop to the homesteaders who settled in eastern Nebraska, and by 1890 the state produced 10 percent of the nation's crop".[16] Its predominance continued through this century. The advent of modern irrigation technology has expanded this state's corn production. Currently it accounts for twice the acreage and nearly four times the value of any other crop.[17] In fact, the value of corn for grain was greater than that of all other crops in 1975.[18] In addition, corn represents, by far, the leading source of feed grain for the state's livestock industry. For many years, Nebraska has ranked either third or fourth among states in corn production.

Roughly 50% of Nebraska's manufacturing industry is linked to agriculture--either in the manufacture of supplies for agriculture, such as fertilizers and farm equipment, or in the processing of agricultural products, such as canning, milling, beefpacking, dog food manufacture, and dairy operations. Much of the remaining industry has located in Nebraska to take advantage of its central location, productive labor force, inexpensive electricity, and favorable atmosphere for industry.

At one time, much of the state's manufacturing industry was concentrated in and around Omaha. "By 1890, Omaha contained a majority of the state's manufacturing activity, with the meat-packing industry providing the bulk of manufacturing growth in that city."[19] Since World War II, a noteworthy shift has occurred in the relative shares of industry which the various counties possess. The interstate highway system's construction; the consequent growth in the trucking industry's importance; and the "spinoff" of many industries from the industrial centers (with their high prevailing wage rates) to the outlying areas (with their moderate wage levels) have induced a dramatic increase in the number of plants and resulting jobs in our nation's rural areas.

Concurrently, Nebraska's rural counties have experienced this increase in industrial activity. Thousands of Nebraskans have gone to work for the new industrial facilities throughout the state as agricultural sector employment opportunities have declined due to considerable productivity gains.

Table VII.1 presents the mix of industrial employment in Nebraska in 1983. One can see that "Food and Kindred Products"--the processing of our state's agricultural output--represents triple the national average of employment share. Yet, one also notes the diversification in the state's industrial mix. Whereas, Nebraska was once nearly entirely dominated by agriculture, the state now has a healthy durable goods sector and nondurable industries unrelated to food. In addition, the state has a large and prosperous service sector, including insurance, finance, education, and government activities.

Table VII.1 Industrial Employment in Nebraska

Industry	Employment (000)		Percentage Distribution		
	Neb 1982	Neb 1974	Neb '82	Neb '74	USA '74
All Manufacturing	86.5	93.2	100	100	100
Durable Goods	42.6	48.4	49	52	59
Construction Material	4.1	4.0	5	4	7
Furniture and Fixtures	1.5	2.5	2	3	1
Primary and Fabricated Metals	7.8	9.2	9	9	15
Machinery Except Electric	10.8	10.3	12	11	11
Electrical Equipment	8.5	11.9	10	13	10
Transportation Equipment	4.6	5.5	5	6	9
Other Durable Goods	5.3	4.9	6	5	6
Nondurable Goods	44.0	44.8	51	48	41
*Food and Kindred Products	25.1	27.8	29	30	9
Textiles and Apparel	2.1	2.5	2	3	12
Paper and Allied Products	1.7	1.4	2	2	4
Printing and Publishing	8.1	6.8	9	7	6
Chemicals and Allied Products	2.7	2.3	3	2	5
Petroleum, Rubber, Plastics, and Leather	4.3	4.0	5	4	6
Mining, Construction, and General Building Contractors	28.9				
Transportation, Communication, and Public Utilities	44.3				
Wholesale Trade	46.6				
Retail Trade	110.2				
Finance, Insurance, and Real Estate	41.3				
Services	122.8				
Personal Services	6.5				
Business Services	18.8				
Health Services	45.1				
Education	18.1				
Social Services	5.9				
All Other Services	36.4				
Total Government Employment	128.7				
Federal	16.1				
State	31.8				
Local	80.9				
TOTAL NONAGRICULTURAL EMPLOYMENT	603.5				
*Food and Kindred Products	25.1				
Meat Products	13.6				
Dairy Product	1.5				
Grain Mill Products	4.1				
Bakery Products	1.5				
Other Food and Kindred Products	4.4				

Source: U.S. Department of Labor, Bureau of Labor Statistics, "Estimates of Nebraska NonFarm Employment Data, Job Count - Workers by Industry," BLS 785, unpublished, September 12, 1983.

VIII. Energy Background

Though Nebraska is a state rich in human resources and many natural resources, it is poor in traditional energy sources. Nebraska currently imports more than 90% of its primary energy. Especially significant are the imports of coal, natural gas, and liquid fuels. Liquid fuels include primarily the various petroleum products used by Nebraska's agriculture, industry, commerce, and residences. Approximately 18% of all energy consumed in Nebraska in 1982 was in the form of gasoline for transportation vehicles. Tables VIII.2 and VIII.3 give the energy consumption and utilization figures for the state. Gasoline sales were about 787 million gallons in 1982, including 90 million gallons of gasohol. Total gasohol availability in Nebraska in 1982 (including, for example, gasohol sales by Omaha firms to Iowa) was about 96 million gallons (see Table VIII.4).

Nebraska's Gasohol Industry

As noted above, Nebraska has a large and growing market for gasohol. Gasohol, often marketed as 'super unleaded,' is a blend of 90% unleaded gasoline and 10% ethanol. (Ethanol is also known as 'ethyl alcohol' and 'grain alcohol' and has the chemical formula C_2H_5OH, or simply EtOH.)

The sale of 90 million gallons of gasohol, then, represents the sale of 9.0 million gallons of ethanol (90 million x 10%). Though this demand is currently supplied almost entirely by ethanol imported from other Midwestern states, the proposed production facilities will soon have the capacity to supply all the current demand.

Figures VIII.2 and VIII.3 show the locations of several small-scale ethanol plants operating in Nebraska and the locations of the three proposed plants discussed below. The existing plants are primarily on-farm facilities designed for small output levels for farm use.

Unlike petroleum-derived liquid fuels, ethanol can be produced in Nebraska from its own resource base. The primary resource input, corn, is produced in abundance in the state. Nebraska's ethanol industry, projected to produce fifty million gallons per year, will require but twenty million bushels of corn annually in a state which grows about 800 million bushels annually. Several chemicals which are used as production inputs in relatively small quantities will be imported.

The ethanol market in Nebraska and surrounding states is already quite substantial and continues to grow. Based on data reported to the Departments of Revenue in Kansas, Nebraska, Iowa, and Missouri, 1981 gasohol consumption was about 250 million gallons. During 1982--though gasoline prices fell slightly--gasohol sales in Nebraska roughly tripled. This phenomenal growth rate has continued into the first half of 1983. Alcohol is increasingly recognized as an octane booster for gasoline produced from lower-grade crude oil which is now being imported due to shifts in the international oil market. The marketing of gasohol as 'super unleaded' has emphasized this aspect, and many newer automobiles designed to use unleaded gasoline have been shown to perform better on higher octane fuel. This trend is expected to continue into the future.

Therefore, Nebraska is in a good position for profitable ethanol production now and in the immediate future. Long-term predictions of gasoline/ethanol/gasohol supply and demand conditions are necessarily difficult to make with much certainty. Yet, the relationship between ethanol and gasoline prices will be a very important determinant of the profitability of ethanol production. The two products clearly represent 'substitutable goods' to some extent, so that the demand for one is partially a function of the other's price. Whereas ethanol's success is at least partially contingent upon the price of gasoline, ethanol's octane-boosting quality serves as a mitigating factor.

In October 1973, Arab nations of the Organization of Petroleum Exporting Countries (O.P.E.C.) placed an embargo on the sale of oil to the West; world oil prices increased dramatically. In 1979, Iran's government fell and, during the ensuing political turmoil, oil exports to the West were eliminated. Again, the equilibrium price of oil rose. The current Iran-Iraq conflict threatens to curtail the volume of oil leaving the Persian Gulf.

Very dramatic reductions in Western demand for oil--combined with recent oil discoveries and expanded production in regions such as Mexico and the North Sea--has produced the current price stability. Slight decreases in marginal oil prices and average world oil prices have occurred. Yet, political turmoil in any one of several strategic regions could cause another disruption in world oil supplies, causing, in turn, prices to again rise.

Although the demand for oil has declined in recent years, demand for gasohol steadily increased. It is in this setting that American corporations have looked favorably upon fuel-grade ethanol production in the Midwest. Many firms have expressed an interest in operation of such industrial facilities in the state, and three such firms have announced plans to begin construction of plants in 1983/1984. These plans are discussed in section II.

Table VIII.1

Super Unleaded with Ethanol (Gasohol)
Available for Sale in Nebraska* (Thousands of Gallons)

	1979	1980	1981	1982	1983	Percent of Previous Year
January	280	1,729	2,514	3,637	11,379	312.9%
February	280	1,926	2,308	4,016	11,107	276.6
March	296	2,878	2,413	4,817	13,361	277.4
April	291	2,687	2,311	4,772	12,522	262.4
May	313	2,915	2,397	4,734	14,199	299.9
June	306	2,579	2,587	6,188	16,010	258.7
July	320	2,749	2,616	7,279	14,779	203.0
August	1,413	2,320	2,478	9,254	17,820	192.6
September	823	2,761	2,547	10,524		
October	922	2,485	2,631	-11,030		
November	802	2,284	2,713	11,431		
December	844	2,825	3,666	12,283		
TOTAL	6,890	30,138	31,181	89,965	111,177	248.7%

The last three months are preliminary
*Gross imports into the state minus exports out of the state
Source: Department of Revenue Tax Form 81-1

Table VIII.2

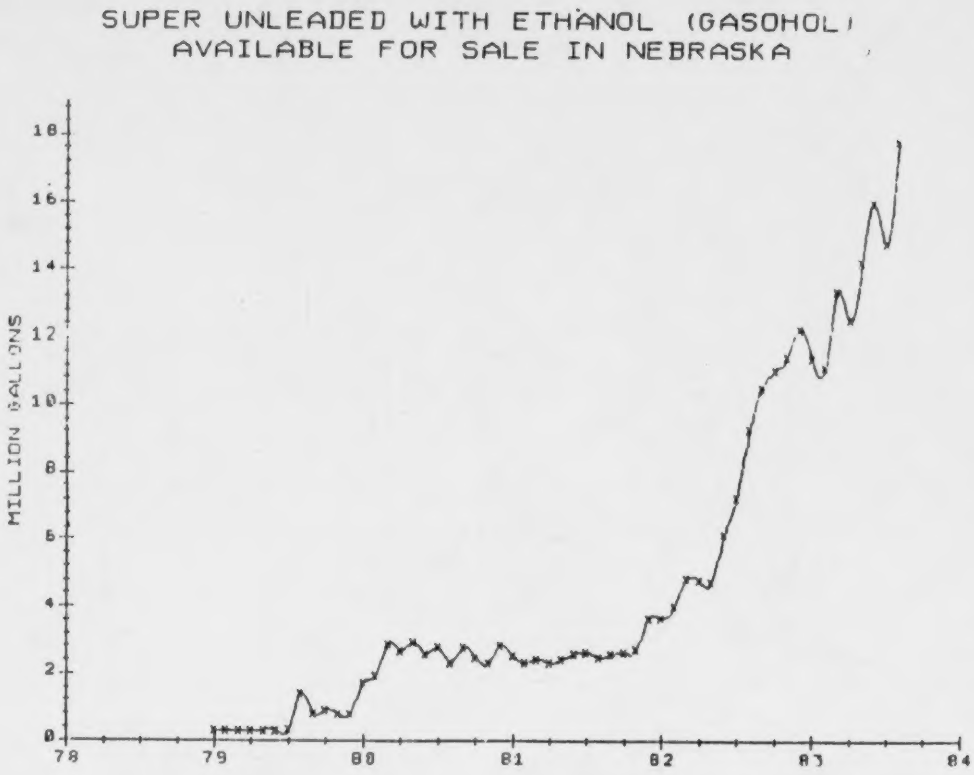
NEBRASKA GASOHOL AVAILABILITY

	1978	1979	1980	1981	1982	1983
January		na	1,729,366	2,586,244	3,934,681	11,817,600
February		1,068,164	1,958,484	2,368,455	4,403,528	11,442,254
March		na	2,963,306	2,466,757	5,251,323	13,953,700
April		na	2,727,872	2,392,436	5,420,056	13,172,077
May		1,757,392	2,968,459	2,476,354	5.054,300	14,950,552
June		552,904	2,616,052	2,659,618	6,510,114	17,040,747
July		943,104	2,778,698	2,675,807	7,679,015	15,430,781
August		873,087	2,373,944	2,526,808	9,764,077	18,617,347
September		999,725	2,823,324	2,609,210	11,074,875	
October	19,333	866,592	2,485,561	2,930,853	11,712,491	
November	19,333	na	2,347,214	2,980,800	12,091,557	
December	19,333	990,134	2,897,902	3,967,663	12,908,471	
TOTAL	58,000	8,052,102	30,670,182	32,641,005	95,804,488	116,425,058

*Source: Nebraska Gasohol Committee

**Not Available for that Month

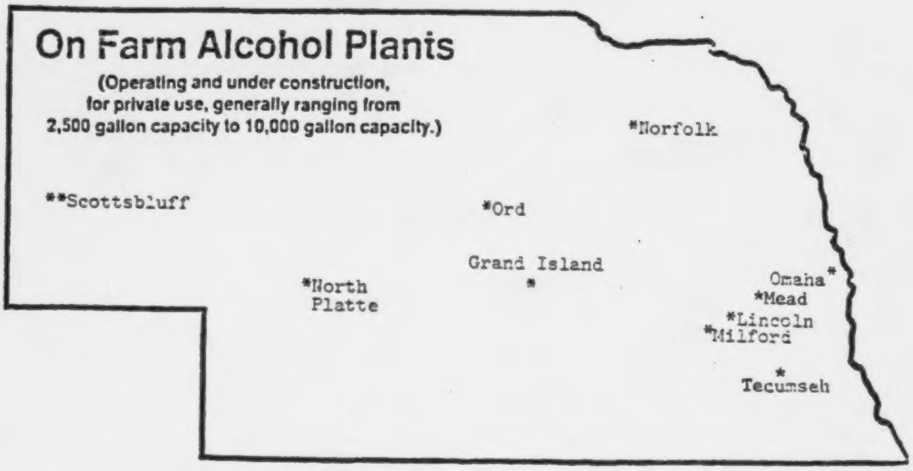
Figure VIII.1



6

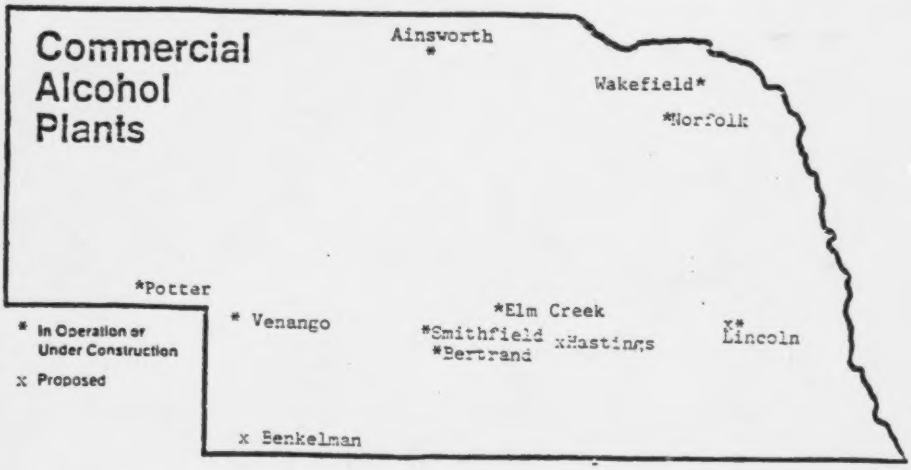
Super Unleaded with Ethanol (Gasohol)
lab or li .ra (Il ud Ga s)

Figure VIII.2


On Farm Alcohol Plants
(Operating and under construction, for private use, generally ranging from 2,500 gallon capacity to 10,000 gallon capacity.)
*Norfolk
**Scottsbluff
*Ord
Grand Island *
*North Platte
Omaha*
*Mead
*Lincoln
*Milford
* Tecumseh

Source: Nebraska Gasohol Committee

Figure VIII.3


Commercial Alcohol Plants
Ainsworth *
Wakefield*
*Norfolk
*Potter
* In Operation or Under Construction
x Proposed
* Venango
*Elm Creek
*Smithfield
*Bertrand
xHastings
x* Lincoln
x Benkelman

Source: Nebraska Gasohol Committee

Table VIII.3 Preliminary Estimates of 1982 Nebraska Energy Consumption by Fuel Type and Consuming Sector

(Trillion = 10^{12} Btu)

Fuel Type	Conversion Factor	Electric Utilities	Residential	Commerce	Industry	Agriculture	Transporation	Total	%
Coal	22.56 x 10^6 Btu/t	114.3	—	0.4	6.9	—	—	121.6	22.8
Natural Gas	0.994 x 10^6 Btu/mcf	2.4	58.1	33.6	30.3	9.8	—	134.2	25.1
Motor Gasoline	0.12495 x 10^6 Btu/gal	—	—	—	—	4.4	94.2	98.6	18.5
Aviation Fuel	0.1334 x 10^6 Btu/gal	—	—	—	—	—	4.0	4.0	0.7
Propane, LP Gas	0.0955 x 10^6 Btu/gal	—	4.1	2.7	1.2	8.2	—	16.2	3.0
Middle Distillates	0.1387 x 10^6 Btu/gal	0.5	2.6	6.3	5.4	19.9	17.4	52.1	9.8
Nuclear		95.7	—	—	—	—	—	95.7	17.9
Hydro		11.4	—	—	—	—	—	11.4	2.1
Electricity Sales	3413 Btu/kWh	(45.7)	19.4	13.2	8.9	4.2	—	NA	—
TOTAL		178.6*	84.2	56.2	52.7	46.5	115.6	533.8	100.0
%		33.5	15.8	10.5	9.9	8.7	21.7	100.0	—

NOTES: Sum of components may not equal total due to independant rounding.
In order to get physical units, divide the Btu by the corresponding conversion factor.
*Generation and transmission losses equal total energy used for generation excluding electricity sales.

Nebraska Energy Office, December, 1982

Table VIII.4 Utilization of Energy in Nebraska

Source	1976	1977	1978	1979	1980	1981 (Revised)	1982 (Prelim.)
Natural Gas (billion cubic feet)							
Residential	53.4	52.9	48.2	53.5	60.0	61.5	60.8
Commercial	38.2	37.5	32.0	31.8	36.6	32.5	33.2
Industrial	58.8	60.4	51.2	50.1	35.5	32.4	30.0
Other (Agr.)	0.1	9.5	8.7	11.7	10.4	11.2	9.7
Electric Utility	17.4	15.6	12.8	14.0	11.7	5.2	1.3
TOTAL NATURAL GAS	168.0	175.9	152.9	161.1	154.2	142.8	135.0
Middle Distillates (million gallons)							
Aviation Fuel	37.6	42.8	46.0	42.4	41.1	34.3	30.3
No. 1 Fuel Oils	14.1	51.6	36.8	42.6	30.7	21.5	19.5
No. 2 Heating Oils	271.7	188.5	191.0	201.9	177.2	156.8	142.0
Diesel Fuel	155.2	294.2	309.9	316.2	270.4	236.5	214.3
TOTAL DISTILLATES	478.6	577.1	583.7	603.1	519.4	449.1	406.1
Propane (LPGas) (million gallons)							
Residential/Commercial	156.1	138.8	141.5	121.9	84.3	67.6	89.4
Internal Combustion	26.3	19.3	17.9	15.4	35.2	28.1	37.2
Industrial	18.3	25.9	19.9	17.2	7.5	9.5	12.5
Other	73.4	65.1	50.3	43.4	33.0	23.0	30.4
TOTAL PROPANE	274.1	249.1	229.6	197.9	160.0	128.2	169.5
Gasoline (million gallons)							
Agricultural	91.7	35.1	24.0	35.2	30.4	31.0	34.0
Transportation	828.6	899.3	927.2	868.1	808.3	761.5	754.5
TOTAL GASOLINE	920.3	934.4	951.2	903.4	839.0	792.5	788.5
Coal (million short tons)							
Commercial	—	0.03	0.01	0.01	—	0.016	0.0
Industrial	—	0.28	0.55	0.55	0.42	0.305	0.305
Electric Utility	—	1.82	2.90	3.46	5.05	4.995	5.068
TOTAL COAL	2.27	2.12	3.46	4.02	5.47	5.316	5.3[illegible]
Electricity Production (GWh = million kWh)							
Hydrostations	1.276	1.221	1.187	1,246	1.335	1.197	1.096
Nuclear	5,824	7,452	7.725	8.658	5.783	5.990	8.980
Coal	3.919	4.493	4.664	6.027	8.123	8.481	7.705
Natural Gas	1.599	1.293	994	1.088	947	352	108
Petroleum	673	425	631	398	126	46	72
TOTAL PRODUCTION	13,291	14.884	15,201	17,417	16,314	16.065	17.960
Electric Sales to Ultimate Consumers (GWh = million kWh)	—	12.404	13,339	13,357	13.708	13.331	13.384
Annual Energy (trillion = 10^{12} Btu)	507.7	547.9	560.3	571.8	540.1	511.6	533.8

NOTES: When reporting data is not available, it is estimated using an appropriate method. Sum of components may not equal totals due to independent roundir

Prepared by Nebraska Energy Office, December, 1982.

IX. Modelling Background

This section provides an explanation of the major methodology employed in this study--input-output analysis. Its assumptions, uses and applications, and limitations are discussed. The application of analytical tools to regional economic impact analysis is also briefly discussed. When possible, examples used in conjuction with each point in this section are taken from the ethanol industry. But technical information concerning the specific use of input-output analysis for investigating ethanol production impacts shall be reserved for the following section.

In addition, a methodology has been employed to analyze the impact which the new industry will have on state tax receipts. This methodology was utilized by an earlier study on impacts of weatherization in Nebraska, and the source is given. Results of other studies of the tax implications are also presented.

Employment impacts are primarily derived from results of previous studies. Like other reports cited in this document, various methodologies have been employed. However, these methodologies will usually not be explicitly detailed in this report.

Input-Output Analysis

Input-output analysis (hereafter referred to as I-O Analysis or simply I-O) originated in 1936 with publication of "Quantitative Input-Output Relations in the Economic System of the United States," by Wassily Leontief. I-O (or interindustry analysis), actually a branch of econometrics, is a statistical technique utilizing matrix algebra--currently an important branch of economics.[20] I-O tables have been prepared for scores of national economies and for numerous economies of subnational regions. "The basic appeal of input-output models stems from the ability to reduce satisfactory answers to many practical economic issues that relate to economic repercussions (or, economic impacts)."[21]

Any I-O model begins with the simple transactions table. This table divides the economy into sectors, or groups of industries. Examples from the 1977 Nebraska I-O Model would be "Irrigated Corn," "Grain Mills," "Textiles," and "Real Estate".[22] The table shows how each sector's output is distributed among the other sectors of the economy. The table is in matrix form, with the sector names appearing as both row headings and column headings in the same order. It also accounts for the inputs to each sector from other sectors (industries). The transactions table, then, should be viewed as a systematic classification of interindustry transactions.[23] Like any accounting method, the table is a "snapshot" of economic activity for a particular time period--that is, it is essentially a static analytic tool which "will not systematically reveal the dynamic characteristics of the region's economy".[24] This report utilizes the 1977 I-O Tables for Nebraska which are the most recently compiled tables. This would have been a source of possible error if particular industries had changed significantly in the past six years. Although the sales patterns of commodities may change over time, the input coefficients (the input-output relationships) "in general do not change rapidly. Accordingly, the I-O tables that are used to quantify these relations retain their usefulness for economic analysis over a period of several years."[25] A simple schematic format of a transactions table is presented in Figure IX.1. A summary of the 1977 State Transactions Table, with many columns (and rows) consolidated into broader categories, is presented in Table IX.1. This table would reveal, for example, 1977 purchases by the wholesale trade sector. It would also show the sales by this particular sector.

The direct requirements table can be derived from a national or regional transactions table. Without explaining the math involved, let it suffice that the numbers in this table--the technical coefficients--represent "the amount of inputs required from each industry to produce one dollar's worth of the output of a given industry."[26] A collapsed direct requirements table for Nebraska, derived from the state's transactions table, is presented in Table IX.2. This table indicates that, in 1977, to produce an additional $100 worth of irrigated crops in Nebraska, the output of the manufacturing sector increased by $4.08 as a result of increased demand on this sector directly from the irrigated crops sector. In addition, an additional input of $27.35 worth of labor was required. In all, the increase of

$100 worth of output in the irrigated crops sector directly required $51.18 worth of inputs from other Nebraska producing sectors and households.

An important assumption inherent in utilizing one year's direct requirements table to predict following years' economic impacts is that the technical coefficients remain fixed. That is, we assume that the "requirements for raw materials, semi-finished products, and finished products are proportional to output."[27] Economists call this condition 'constant returns to scale,' and, although it isn't exactly the way the real world behaves, for most uses of I-O it will sufficiently approximate industry changes.[28]

Finally, the total requirements tables can be derived, again using matrix algebra and a modern, high-speed computer. A set of tables, which predict the total impacts of changes within any sector, can be obtained. In other words, when the stable model is perturbed by an incremental increase in any one sector, it will project the increases which will occur in all the sectors. For example, when an additional $1 million of output is produced in an industry, such as food processing, other increases will be required in other manufacturing industries and in other sectors which supply the factories in the industry under focus, food processing. The impact on the sectors which directly supply food processing is known as the direct impact. Those sectors, in turn, will also require additional inputs of raw materials, energy, and labor. The generation of these secondary activities is known as the indirect impact. Increased demand for labor will stimulate employment gains and personal income gains. The increased income will generate new consumer spending, which induces increased activity levels by consumer product manufacturers, wholesalers, and retailers. Some of the new income will find its way into the education, finance, insurance, real estate, service, and government sectors. From these sectors, some income and taxes will flow to yet other businesses and individuals. The economic activity which is induced by the higher consumer spending levels is known as the induced impact. When all the impacts from increased demand levels are taken into account, we have what is called the 'gross output multiplier.'

This total output multiplier is the 'bottom line' which indicates the total impact in the state's economy (when using a state model) of a change in the level of output in one particular sector. Refer to Table IX.4 and observe that every $1 increase in manufacturing output generated an additional state value of output of $2.11. This is the aggregate impact value for all manufacturing in Nebraska. Note that this includes the $1 increase in the manufacturing sector itself. In addition, notice that an additional 50 cents worth of labor is produced (households row = 0.4973).

The value in the households row of the total requirements table for this study's surrogate sector--#19, grain milling--is 0.677905 (see Appendix IX.C). This labor coefficient indicates that for every $1 increase in grain mill output, 67.8 cents worth of labor will be required by all directly and indirectly impacted sectors. This value is used to determine the change in state personal income (see Appendix V.A). The actual state personal income increase generated by ethanol production is expected to be slightly larger, due to its larger direct labor coefficient.

Several important comments about the assumptions involved in deriving the total requirements and about the use of input output analysis deserve attention. First, the 'constant returns to scale' assumption--that the relationship between inputs and outputs is proportional--is valid for initial changes within a certain range. When an industry expands its output by 10%, for example, it is valid to assume it will require 10% more of its inputs. However, when an industry triples in size, the relationships may change; the assumption may be violated. Yet, the constant returns condition is realistic for an industry group because "aggregation will tend to average out internal differences in economies of scale."[29] The greatest value of the multiplier lies in its ability to project total impacts generated by relatively small changes within one of the processing sectors.

Second, the input coefficients are average relationships. Though industries within any one sector will exhibit great similarity in requirements, certain ones may deviate somewhat from the aggregate values.

Third, the model is rooted in historical prices and relationships and does not truly predict future changes in these relationships based on any causal connection.

Fourth, the derivation assumes no substitution of inputs. For a regional model such as the one used in this study, this assumption also means that regional input sources are not substitutable for sources outside the region. (The technical coefficients of a regional transactions table really only show the amount of technical requirements purchased from in-state suppliers, not the total inputs.) The larger the region under study, the less significant the import of inputs and the less this assumption constrains our analysis. (In any case, the primary input for ethanol production and grain milling is corn, which is not generally imported into this state.)

Finally, technological changes must not occur. This condition is also not entirely realistic, but the aggregation into broader industry classification will again probably cancel out the effect of different technologies.

Whereas the indirect "induced by" impacts are easily recognized and measured, the indirect "stemming from" impacts are more difficult to assess. The "stemming from" impacts of economic activity occur when the new output itself provides the source of further economic activity; these are supply-oriented impacts (from forward linkages), rather than impacts deriving from increased demand (backward linkages). An example would be a new computer chip manufacturer's impact on the electronics industry. If a new plant opened which produced electronic memory semiconductor chips in a Nebraska community, then manufacturers of consumer products which use such chips (such as home computer manufacturers) might choose to locate in the same area to benefit from agglomeration economies, such as communication and inventory efficiency. These other new plants would employ Nebraskans, purchase supplies, and pay taxes. The latter economic activities would "stem from" the earlier activity of the semiconductor manufacturer.

In the case of product substitution, in which output of a new plant simply displaces another similar product in the local economy, no net 'stemming from' impact is experienced. The ethanol industry will produce products which are largely substitutes or substitutable. The ethanol will displace gasoline; the DDGS will displace soybean meal, to some extent; however the CO_2 may have the potential for creating an entirely new industrial complex in Nebraska. In addition to its principal application in tertiary injection for petroleum extraction, CO_2 can also be used in food processing--in meat packing and in flash freezing. However, the total "stemming from" impacts of the ethanol industry cannot be easily quantified given the current lack of information.

Methodology of Ethanol Study

This sector presents the details of the methodology as employed by this study. The previous section introduced the input-output analysis framework whereas this section expands the discussion to include direct application to ethanol facilities and the assumptions behind such an application.

The analysis in this report was conducted in the context of 'steady-state' economic conditions; it is assumed there will be no one-time tax credits, major market fluctuations, or public policy dynamics.

The primary source for this study is the set of input-output tables most recently compiled for Nebraska. These are the *1977 Nebraska Input-Output Tables* (unpublished) compiled by Professor F. Charles Lamphear of the University of Nebraska-Lincoln. These tables capture first the transactions which occur between the various economic sectors *in Nebraska*. Then they convert the transactions into direct and total requirements tables, as described in the previous section.

Because the tables are based only on intra-state transactions, only impacts upon Nebraska firms and individuals will be reported. The *total* impacts will not be reported; impacts which occur outside this state (as a result of the new ethanol industry) will not be captured in the figures. Consequently, the scope of the investigation, as outlined by the study's purpose, is facilitated by the source of data and the methodology. (Positive impacts will accrue outside the state when, for example, ethanol customers in Denver and Council Bluffs can purchase the fuel at a price lower than the current price, due to proximity and reduced transportation costs.) Other positive benefits will occur when Nebraskans (with increased buying power as a result of the ethanol plants) will purchase goods and services from outside producers and suppliers. Finally, it must be noted again that some of the changes generated by economic disturbance in the input-output model will be substitutions. Clearly, the ethanol supplied by Nebraska plants will replace ethanol currently produced by non-Nebraska producers. Those producers (and their employees, suppliers, distributors, etc.) may experience some loss of economic activity as a result of Nebraska's new industry.

Although the geographic scope of the study is chosen to be the state of Nebraska, it must be noted that the impacts are not felt evenly across the state. The magnitude of economic impact is generally a direct function of the size of the study area. If the specific community is selected, the impact is necessarily smaller, since leakage occurs from that community. In other words, although Benkelman will experience a significant impact relative to the size of its economy, many of the new dollars will 'leak' out of that economy as individuals purchase consumer goods in Denver and other distant markets; as retailers in Benkelman import wholesale goods to satisfy the increased demand for these goods at their establishments; and as the plant itself purchases inputs and supplies from outlying areas.

Some of the impacts of these new economic activities will "spill out" to other parts of the state and outside the state, as well. The Nebraska figures derived from the I-O Tables will, consequently, be greater than the sum of the impacts upon the three local communities. The entire state will benefit from the new facilities, particularly when the redistributive effect of the state tax system is considered. But the impacts will clearly not be ubiquitous.

In addition to the geographic study area, the impact analysis must be based on certain time frame assumptions. As stated in an earlier section, this report will concentrate on annual impacts, and it is assumed that the plants will be constructed and operational by the end of 1985. Therefore, the annual impacts will be for 1986. No attempt to predict inflationary trends is made; all prices (values) are in 1983 dollars. The relationships in the tables are based on 1977 relative prices and should be valid if all prices rose at the same rate and if the physical input requirement did not change appreciably. Some degree of error can be associated with using 1977 economic relationships on projected 1986 disturbances in Nebraska's economy. With changing technology, population, and economic institutions, the transaction levels and specific input mixes will change. Yet, those changes are generally not of great magnitude, and the results can be assumed to be valid approximations.

Another important assumption involves the nature of the ethanol industry itself. Because Nebraska's ethanol industry in 1977 was very small and because the tables represent sectors, in most cases--or aggregates of related industries--the actual relationship between the ethanol industry and other Nebraska industries is not known. Therefore, we do not know the multipliers and total impacts associated with a disturbance in the ethanol industry. To estimate these impacts, a 'surrogate sector' is used. Sector #19 was chosen in order to analyze the impact of the ethanol production. Sector #19, "Grain Mills," is described as "flour and other grain mill products, prepared feeds, cereal preparations, rice milling, blended and prepared flour, and wet corn milling."[30]

Although using a surrogate sector clearly has its limitations, it is a generally-accepted practice which must be employed in this type of situation. The most obvious similarity between ethanol production and grain milling is the degree to which both utilize grain as their dominant input factor of production. This demand for grain (corn) surpasses the other inputs, such as energy, labor, and chemicals (in both cases). The corn milling industry (including ethanol production) requires slightly greater labor inputs than does the grain milling sector, in general.

Although ethanol production requires quite similar inputs (corn, labor, energy) during the operation phase, the construction phase may be substantially dissimilar. This factor is immaterial because impacts during construction are treated differently.

Figure IX.1

GROSS NATIONAL PRODUCT

In the National Income and Product Accounts

Compensation of employees	Personal consumption expenditures
Proprietors' income	Gross private domestic investment
Rental income of persons	Net exports
Corporate profits	Government purchases
Net interest	
Business transfer payments	
Indirect business taxes	
Less: Subsidies less current surplus of government enterprises	
Capital consumption allowances	
(CHARGES AGAINST GNP)	GNP

*Consists of proprietors' income, rental income of persons, corporate profits, and business transfer payments, less subsidies, etc.

U.S. Department of Commerce, Bureau of Economic Analysis

In an Input-Output Format

	PRODUCERS	FINAL DEMAND				
PRODUCERS	▨	Personal consumption expenditures	Gross private domestic investment	Net exports	Government purchases	GNP
VALUE ADDED	Compensation of employees					
	Profit-type income*, net interest & capital consumption allowances					
	Indirect business taxes					
	Charges against GNP					

INPUT-OUTPUT TABLE

		PRODUCERS									FINAL DEMAND (GNP)				GROSS OUTPUT
		Agriculture	Mining	Construction	Manufacturing	Transportation	Trade	Finance	Services	Other	Personal consumption expenditures	Gross private domestic investment	Net exports	Government purchases	
PRODUCERS	Agriculture														
	Mining														
	Construction														
	Manufacturing														
	Transportation														
	Trade														
	Finance														
	Services														
	Other														
VALUE ADDED (Charges against GNP)	Compensation of employees														
	Profit-type income*, net interest & capital consumption allowances														
	Indirect business taxes														
GROSS INPUT															

*Consists of proprietors' income, rental income of persons, corporate profits, and business transfer payments, less subsidies, etc.

U.S. Department of Commerce, Bureau of Economic Analysis

Source: Ritz, Philip M. "The Input-Output Structure of the U.S. Economy, 1972." Survey of Current Business Vol. 59, No. 2, February, 1979, page 36.

Table IX.2

Nebraska

1977 State Transactions Table
(In $1,000s of Dollars)

	Dryland Crops	Irr. Crops	Livest. & L. Prodc.	Mining	Manufac- turing	Retail Trade	Wholesale Trade	Other Services	Agricul. Services	FIRE	Util. & Transport.	Con., Sp. Tr., H & R	House- holds	Final Demand
Dryland Crops	250644.	0.	0.	0.	1276210.	1310.	0.	3342.	0.	0.	0.	0.	13987.	671478.
Irr. Crops	127062.	18552.	3639.	0.	325474.	0.	0.	0.	0.	0.	0.	0.	1742.	924183.
Livest. & L. Prod.	271453.	3234.	24625.	0.	255066.	0.	0.	0.	0.	0.	0.	0.	5348.	755082.
Mining	0.	1061.	1163.	9551.	117.	0.	0.	0.	0.	2248.	78.	15179.	0.	114656.
Manufacturing	80878.	57142.	49741.	6180.	291754.	23421.	7837.	14580.	110.	10699.	4955.	87333.	731524.	7287046.
Retail Trade	15157.	45658.	41503.	1829.	7126.	2854.	3219.	4377.	134.	9926.	3524.	7583.	1244143.	235093.
Wholesale Trade	37438.	15605.	14700.	2696.	24776.	19063.	3754.	18603.	930.	4363.	6592.	27949.	210627.	622697.
Other Services	5084.	5840.	5805.	1582.	57761.	16814.	17685.	38657.	1878.	52106.	36455.	12382.	1232791.	1485989.
Agricul. Services	50745.	19280.	22448.	0.	0.	0.	0.	0.	386.	0.	0.	0.	7549.	2705.
FIRE	95132.	137322.	136622.	5265.	41904.	100666.	62105.	115981.	1841.	148814.	39491.	21998.	2020570.	856815.
Util. & Transport.	18341.	19078.	15371.	2930.	116019.	42731.	30506.	36762.	1410.	38571.	27039.	5860.	334846.	785336.
Con., Sp. Tr., H & R	5422.	11032.	9888.	3646.	74316.	13163.	6034.	15545.	1794.	15044.	8825.	718594.	144895.	1045594.
Households	259905.	383106.	293510.	57406.	2011142.	1066396.	735841.	2118947.	46190.	2271527.	713333.	715909.	220344.	0.
Other Payments	999700.	683739.	695802.	52939.	4171531.	335704.	142817.	604029.	48434.	1231223.	634505.	461004.	4725257.	0.
Column-Totals	2216967.	1400655.	1314803.	144028.	8653202.	1622128.	1009801.	2970828.	103111.	3804526.	1474801.	2073796.	10893629.	14786681.

Source: Resource Economics and Management Analysis, Inc., Input-Output Analysis: An Introduction. Lincoln, Ne., 1982, page 9.

Table IX.3

Nebraska

1977 State Direct Requirements Table

	Dryland Crops	Irr. Crops	Livest. & L. Prod.	Mining	Manufac-turing	Retail Trade	Wholesale Trade	Other Services	Agricul. Services	FIRE	Util. & Transport.	Con. Sp. Tr., M & R	House-holds
Dryland Crops	0.1131	0.0	0.0	0.0	0.1475	0.0008	0.0	0.0011	0.0	0.0	0.0	0.0	0.0013
Irr. Crops	0.0573	0.0132	0.0028	0.0	0.0376	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0002
Livest. & L. Prod.	0.1224	0.0023	0.0187	0.0	0.0295	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0005
Mining	0.0	0.0008	0.0009	0.0663	0.0	0.0	0.0	0.0	0.0	0.0006	0.0001	0.0073	0.0
Manufacturing	0.0365	0.0408	0.0378	0.0429	0.0337	0.0144	0.0078	0.0049	0.0011	0.0028	0.0034	0.0421	0.0672
Retail Trade	0.0068	0.0326	0.0316	0.0127	0.0008	0.0018	0.0032	0.0015	0.0013	0.0026	0.0024	0.0037	0.1142
Wholesale Trade	0.0169	0.0111	0.0112	0.0187	0.0029	0.0118	0.0037	0.0063	0.0090	0.0011	0.0045	0.0135	0.0193
Other Services	0.0023	0.0042	0.0044	0.0110	0.0067	0.0104	0.0175	0.0130	0.0182	0.0137	0.0247	0.0060	0.1132
Agricul. Services	0.0229	0.0138	0.0171	0.0	0.0	0.0	0.0	0.0	0.0037	0.0	0.0	0.0	0.0007
FIRE	0.0429	0.0980	0.1039	0.0366	0.0048	0.0621	0.0615	0.0390	0.0179	0.0444	0.0268	0.0106	0.1855
Util. & Transport.	0.0083	0.0136	0.0117	0.0203	0.0134	0.0263	0.0302	0.0124	0.0137	0.0101	0.0183	0.0028	0.0307
Con., Sp. Tr., M & R	0.0024	0.0079	0.0075	0.0253	0.0086	0.0081	0.0060	0.0052	0.0174	0.0040	0.0060	0.3465	0.0133
Households	0.1172	0.2735	0.2232	0.3986	0.2324	0.6574	0.7287	0.7133	0.4480	0.5971	0.4837	0.3452	0.0202

Source: Resource Economics and Management Analysis, Inc., Input-Output Analysis: An Introduction, Lincoln, Ne., 1982, page 12.

Table IX.4

Nebraska

1977 State Total Requirements Table
(With Households)

	Dryland Crops	Irr. Crops	Livest. & L. Prod.	Mining	Manufacturing	Retail Trade	Wholesale Trade	Other Services	Agricul. Services	FIRE	Util. & Transport.	Con., Sp. Tr., M & R	Households
Dryland Crops	1.1430	0.0169	0.0154	0.0205	0.1817	0.0204	0.0199	0.0196	0.0118	0.0153	0.0130	0.0249	0.0227
Irr. Crops	0.0702	1.0181	0.0071	0.0057	0.0522	0.0054	0.0054	0.0051	0.0032	0.0042	0.0035	0.0070	0.0062
Livest. & L. Prod.	0.1457	0.0077	1.0239	0.0064	0.0557	0.0063	0.0063	0.0060	0.0038	0.0049	0.0041	0.0078	0.0072
Mining	0.0005	0.0012	0.0013	1.0717	0.0004	0.0006	0.0006	0.0005	0.0005	0.0011	0.0005	0.0124	0.0006
Manufacturing	0.0882	0.0945	0.0861	0.1143	1.0872	0.1050	0.1061	0.0977	0.0628	0.0812	0.0690	0.1399	0.1198
Retail Trade	0.0702	0.1105	0.1011	0.1129	0.0682	1.1396	0.1538	0.1439	0.0947	0.1231	0.1028	0.1170	0.1855
Wholesale Trade	0.0335	0.0278	0.0262	0.0409	0.0200	0.0396	1.0340	0.0348	0.0281	0.0253	0.0248	0.0435	0.0366
Other Services	0.0642	0.0875	0.0790	0.1173	0.0746	0.1561	0.1766	1.1629	0.1168	0.1406	0.1308	0.1265	0.1938
Agricul. Services	0.0301	0.0150	0.0184	0.0013	0.0062	0.0015	0.0015	0.0015	1.0047	0.0012	0.0010	0.0015	0.0018
FIRE	0.1784	0.2493	0.2406	0.2260	0.1404	0.3185	0.3411	0.3022	0.1910	1.2673	0.2132	0.2235	0.3385
Util. & Transport.	0.0345	0.0442	0.0394	0.0590	0.0397	0.0761	0.0842	0.0629	0.0472	0.0529	1.0544	0.0454	0.0644
Con.,Sp.Tr., M & R.	0.0216	0.0318	0.0295	0.0652	0.0303	0.0442	0.0437	0.0404	0.0480	0.0335	0.0322	1.5570	0.0413
Households	0.4765	0.6613	0.5879	0.8506	0.5407	1.186:	1.2971	1.2276	0.8037	1.0383	0.8649	0.9557	1.6016
Final Demand Multipliers	2.3565	2.3660	2.2560	2.6918	2.2873	3.0993	3.2704	3.1051	2.4163	2.7888	2.5142	3.2618	2.6200

Source: Resource Economics and Management Analysis, Inc., Input-Output Analysis: An Introduction, Lincoln, Ne., 1982, page 13.

Table IX.5
Nebraska

1977 State Output Multiplier Table
(With Households)

	Dryland Crops	Irr. Crops	Livest. & L. Prod.	Mining	Manufac-turing	Retail Trade	Wholesale Trade	Other Services	Agricul. Services	FIRE	Util. & Transport.	Con., Sp. Tr., H & R	House-holds
Dryland Crops	1.0000	0.0166	0.0150	0.0191	0.1671	0.0179	0.0192	0.0169	0.0118	0.0121	0.0123	0.0160	0.0141
Irr. Crops	0.0615	1.000	0.0070	0.0053	0.0481	0.0047	0.0052	0.0044	0.0032	0.0033	0.0034	0.0045	0.0038
Livest. & L. Prod.	0.1275	0.0075	1.0000	0.0060	0.0513	0.0055	0.0061	0.0052	0.0038	0.0039	0.0039	0.0050	0.0045
Mining	0.0004	0.0012	0.0013	1.0000	0.0004	0.0005	0.0006	0.0004	0.0005	0.0009	0.0004	0.0079	0.0003
Manufacturing	0.0772	0.0929	0.0841	0.1066	1.0000	0.0921	0.1026	0.0840	0.0625	0.0641	0.0655	0.0899	0.0748
Retail Trade	0.0614	0.1085	0.0988	0.1053	0.0628	1.0000	0.1488	0.1238	0.0942	0.0972	0.0975	0.0751	0.1158
Wholesale Trade	0.0293	0.0273	0.0256	0.0382	0.0184	0.0347	1.000	0.0299	0.0280	0.0199	0.0235	0.0279	0.0229
Other Services	0.0562	0.0860	0.0772	0.1094	0.0686	0.1370	0.1708	1.0000	0.1163	0.1109	0.1241	0.0812	0.1210
Agricul. Services	0.0263	0.0148	0.0180	0.0012	0.0057	0.0013	0.0015	0.0013	1.0000	0.0010	0.0010	0.0009	0.0012
FIRE	0.1561	0.2449	0.2350	0.2109	0.1291	0.2795	0.3299	0.2599	0.1901	1.0000	0.2022	0.1435	0.2114
Util. & Transport.	0.0302	0.0434	0.0385	0.0551	0.0365	0.0668	0.0815	0.0541	0.0470	0.0418	1.0000	0.0291	0.0402
Con., Sp. Tr., H & R	0.0189	0.0312	0.0288	0.0608	0.0278	0.0388	0.0423	0.0347	0.0478	0.0264	0.0305	1.0000	0.0258
Households	0.4169	0.6495	0.5741	0.7937	0.4973	1.0408	1.2545	1.0557	0.7999	0.8193	0.8203	0.6138	1.0000
Total Output - Multipliers	2.062	2.324	2.203	2.512	2.113	2.720	3.163	2.670	2.405	2.201	2.384	2.095	1.636

Source: Resource Economics and Managemant Analysis, Inc., Input-Output Analysis: An Introduction, Lincoln, Ne., 1982, page 21.

Appendix IX.A Income Multiplier

Fundamental to economic impact analysis is the concept of economic multipliers. Economists have identified the income multiplier, the tax multiplier, the export base multiplier, the gross output multiplier, and others. This appendix demonstrates how the income multiplier operates in a hypothetical example. See Sections III and IV for discussions of the process behind the income multiplier for the ethanol industry.

If it is assumed that $100,000 is spent in the state of Nebraska by a new business enterprise, then the initial impact would be to create new income of $100,000 ($\Delta I$) in the forms of wages, salaries, and profits. Individuals and businesses do not immediately spend all of their new income on consumption. A portion of that new income "leaks" out of the flow of spending when it is saved. This portion will vary considerably from person to person, but it is probably always considerably less than 25%. Twenty-five percent will be used for this hypothetical example, however, leaving 75% or 3/4 ΔI for consumption. ($\Delta I = \Delta C + \Delta S$; $\Delta C = .75$ = Marginal Propensity to Consume (MPC))

Therefore, in the table below, $75,000 of the initial income will be spent on goods and services. This $75,000 becomes income to another group of individuals who, in turn, spend 75% of that amount on further consumption.

With each subsequent round, 75% of one group's income becomes another group's income; new consumption is created; new saving is created; and the "respending" process continues until the amounts of the ΔC and ΔS become negligible.

Without displaying each iteration in the figure below, a final increase of $400,000 can be observed in new income created by the initial expenditure of $100,000. The multiplier in this example is four (4). The multiplier is equal to the reciprocal of the percentage saved, or

$$K_{income} = \frac{1}{1-MPC} = \frac{1}{S} = \frac{1}{.25} = 4.$$

If a more realistic marginal propensity to consume of 0.90 were assumed, then the related income multiplier would be

$$K_{income} = \frac{1}{1-MPC} = \frac{1}{1-.9} = \frac{1}{.10} = 10.$$

However, many "leakages" from the income stream (besides savings) occur in the many rounds of respending, when consumption of goods and services imported from outside this state occur. When part of the consumption spending leaves Nebraska, the appropriate income multiplier for the state will be smaller.

Round	Expenditures	ΔI (Income)	ΔC (Consumption)	ΔS (Savings)
1	$100,000	100,000	$ 75,000	$ 25,000
2		75,000	56,250	18,750
3		56,250	42,187.50	14,062.50
4		42,187.50	31,640.63	10,546.88
.		.	.	.
.		.	.	.
.		.	.	.
sr*		126,562.50	94,921.87	31,640.62
Totals	$100,000	$400,000	$300,000	$100,000

(assuming MPC = 0.75 and no leakages)
*subsequent rounds

A state economy's multiplier will be lower than a national economy's as a result of the leakage which occurs when goods are purchased from other states. If, for example, total leakages (savings, state imports, etc.) equalled 33%, then the income multiplier for the state would be

$$K_{income} = \frac{1}{.33} = 3.$$

If leakages equalled 40%, the K_{income} = 2.5 and if leakages were greater than 50%, then the multiplier would be less than 2.

One can see that ethanol production would entail certain imports. However, the major production inputs: corn, labor, etc., are available from within the state's borders. Therefore, the income multiplier for a fuel-grade ethanol facility's operating expenditures would tend to be relatively high.

Appendix IX.B Export Base Multiplier

The export base multiplier concept rests on the separation of basic and nonbasic economic activities. Basic activities are those which produce goods or services for individuals, firms, and governments outside the region; the basic industries produce for export. The nonbasic sectors serve to satisfy internal demand; this group is mostly comprised of service industries. When exports increase, internal demand will rise. As the basic industries increase production levels, they purchase more raw materials and supplies locally, and they raise regional income levels as they hire new workers. As the internal demand grows, service sector income will rise. Therefore, nonbasic employment (and income) is indirectly a function of the level of exports. Increases in the dollar value of regional exports can have a multiplicator effect on the entire region's income.

The same can be said of import reductions. Currently, Nebraska imports its ethanol from outside suppliers, primarily Archer-Daniels Midlands (Illinois and Iowa). Some ethanol is also imported from Midwest Solvents of Atchison, Kansas. If ethanol and petroleum imports were reduced, dollars which would have left Nebraska would then remain within the state to be spent, respent, and so on.

Additionally, if some of the output would be exported, as anticipated, the income from such sales would also be subject to the multiplier effect. This effect would probably be greater than that which would stem from simply exporting the corn used as production inputs for ethanol facilities, due to the value added by ethanol manufacture.

In either case, a change in net exports, ΔX = total exports minus total imports, would occur. This change would result in a change in state income, ΔY_{NE}. as described by the following equation:

$$\Delta Y_{NE} = \frac{1}{1-MPC} \Delta X_{NE}$$

where MPC = the marginal propensity to consume. ΔY_{NE} in this equation would capture all of the *direct* impacts on wages, salaries, and profits; the *indirect* impacts on suppliers within the state; and *induced* impacts on other sectors, which are generated by consumer spending.

If the MPC is taken as only that percentage of each marginal dollar which is spent on final demand *within* the state, the generalized aggregate export multiplier will be only 1.5 to 2.0. Therefore, a reduction of about $18 million in imports (based on 1982 gasohol sales of about $96 million x 10% x $1.81/gallon for ethanol) might generate approximately $25 to $35 million in new income. In addition, exports of the remaining ethanol production might produce increases of more than $100 million in state personal income. Overall impact upon Nebraska income might, therefore, exceed $150 million annually.

Appendix IX.C Grain Milling - Sector #19 - Requirements Tables

Sectors	Direct Requirements	Total Requirements (households endogenous)
1 Range Cattle	0.0	0.002183
2 Feedlots	0.0	0.005956
3 Other Livestock & Livestock Products	0.048948	0.064582
4 Irrigated Corn	0.343186	0.378420
5 Irrigated Wheat	0.000671	0.000735
6 Irrigated Grain Sorghum	0.002032	0.003698
7 Irrigated Soybeans	0.0	0.000029
8 Irrigated Alfalfa	0.019564	0.022461
9 Other Irrigated Crops	0.0	0.000540
10 Dryland Corn	0.136005	0.158448
11 Dryland Wheat	0.035736	0.039626
12 Dryland Grain Sorghum	0.005846	0.007014
13 Dryland Soybeans	0.0	0.000301
14 Dryland Alfalfa	0.039019	0.045181
15 Other Dryland Crops	0.048069	0.056962
16 Mining	0.0	0.000905
17 Meat Products	0.003832	0.020523
18 Dairy Products	0.0	0.006622
19 Grain Mills	0.057705	1.070311
20 All Other Foods	0.002421	0.022009
21 Textiles	0.0	0.000001
22 Paper and Allied Products	0.002996	0.003760
23 Printing and Publishing	0.0	0.000629
24 Agricultural Chemicals	0.000224	0.023662
25 Other Chemicals	0.000121	0.000758
26 Metal Products	0.0	0.001096
27 Farm Machinery Manufacturing	0.0	0.005349
28 Electrical Machinery Manufacturing	0.001573	0.001708
29 Other Machinery Manufacturing	0.0	0.000099
30 Trailers and Coaches	0.0	0.000523
31 Other Manufacturing	0.0	0.003125
32 Retail	0.000108	0.103582
33 Wholesale	0.004154	0.030405
34 Other Services	0.001809	0.053451
35 Medical Services	0.0	0.030915
36 Educational Services	0.0	0.005378
37 Agricultural Services	0.0	0.015919
38 Finance and Insurance	0.000539	0.074068
39 Real Estate	0.000091	0.151048
40 Utilities	0.005442	0.037424
41 Transportation	0.017287	0.027504
42 Construction	0.004103	0.004554
43 Special Trades	0.0	0.029431
44 Maintenance and Repairs	0.006754	0.026357
45 Households	0.123971	0.677905
46 Other Payments	0.087792	3.215159*
47 Control Totals	-	3.003949**

* Final demand multiplier
**Gross output multiplier

ENDNOTES

[1] U.S. Congress, Joint Economic Committee. "Estimating the Social Costs of National Economic Policy: Implications for Mental and Physical Health and Criminal Aggression," by M. Harvey Brenner. Washington, D.C.: Government Printing Office, Oct. 26, 1976.

[2] F. Charles Lamphear, "1977 Nebraska Input-Output Tables," unpublished at this writing.

[3] F. Charles Lamphear and Theodore W. Roesler, 1970 Nebraska Input-Output Tables, Nebraska Economic and Business Report Number Ten. Bureau of Business Research, University of Nebraska- Lincoln, 1975. (#7 - "Grain Products")

Note: The 1970 tables, where "grain products" was sector #7, were expanded in 1977 to include additional sectors. Thus, the sector number (#19) for "grain products" is different in the 1977 tables.

[4] Telephone interview with Ray Davy, President, Nebraska Alcohol Fuels Corporation. September, 1983.

[5] Agri Food and Fuel Cooperative. Press Release. July 23, 1981.

[6] U.S. Department of Energy, Office of Alcohol Fuels. Analysis of Impacts of Ethanol Production in 48 States. Prepared by Resource Planning Associates, Inc., September, 1981, Appendix B.

[7] U.S. Department of Energy. "Feasibility Study for Alternative Fuels Production in Lincoln, Nebraska." Vols. I-III. (Prepared by Nebraska Alcohol Fuels Corporation, Lincoln, Ne.) November 30, 1981, page 68.

[8] U.S. Department of Energy. Op. cit., Appendix C.

[9] Ibid.

[10] Hauser, Robert J., and John B. Braden, Economic Impacts of Corn Utilization in the Sweetener and Fuel Alcohol Industries. Prepared for Illinois Corn Growers Association, Bloomington, Ill., June, 1982, pages 6-7.

[11] Hertzmark, Donald, et. al. The Agricultural Sector Impacts of Making Ethanol from Grain. (Prepared by Solar Energy Research Institute, Golden, Colorado for U.S. Department of Energy.) March, 1980, page 6.

[12] Average weekly benefit, January 1983. Nebraska Work Trends, Nebraska Department of Labor, Division of Employment, Research, and Statistics, January 1983, page 11.

[13] Telephone interview with Bob Mehta, Ph.D., Vice President and Project Coordinator for the American Development Corporation, Los Angeles. January, 1983.

[14] U.S. Department of Energy, Op. cit., Vol. I, page VI-B-1.

[15] Op. cit., Vol. I, page VIII-3.

[16] James H. Williams, *Economic Atlas of Nebraska*, edited by Richard E. Lonsdale, Lincoln, Ne.: University of Nebraska Press, 1977, page 57.

[17] Ibid.

[18] Ibid.

[19] Miller, Stuart, and Donis N. Petersan, *Economic Atlas of Nebraska*, edited by Richard E. Lonsdale, Lincoln, Ne.: University of Nebraska Press, 1977, page 76.

[20] Miernyk, William H. *The Elements of Input-Output Analysis*. New York: Random House, Inc., 1965, page 6.

[21] Resource Economics and Management Analysis, Inc., *Input-Output Analysis: An Introduction*. Lincoln, Ne., 1982, page 1.

[22] F. Charles Lamphear, "1977 Nebraska Input-Output Tables," unpublished at this writing.

[23] Resource Economics, op. cit., page 4.

[24] Resource Economics, op. cit., page 3.

[25] Ritz, Philip M. "The Input-Output Structure of the U.S. Economy, 1972." *Survey of Current Business* Vol. 59, no. 2 February, 1979, page 37.

[26] Miernyk, op. cit., page 21.

[27] Ritz, op. cit., page 37.

[28] Ritz, op. cit., page 37.

[29] Resource Economies, op. cit., page 29.

[30] Lamphear, F. Charles, and Theodore W. Roesler, *1970 Nebraska Input-Output Tables*, Nebraska Economic and Business Report Number Ten. Bureau of Business Research, University of Nebraska-Lincoln, 1975.

BIBLIOGRAPHY

Agri Food and Fuel Cooperative, St. Francis, Kansas. News Release. 23 July 1981.

Anderson, Marion, and Carl Parisi. American Jobs from Alcohol Fuel. (Prepared by Employment Research Associates, Lansing, Michigan.) 1981.

Brenner, M. Harvey. Estimating the Social Costs of National Economic Policy: Implications for Mental and Physical Health and Criminal Aggression. Washington, D.C.: U.S. Congress Joint Economic Committee. 26 October 1976.

Davy, Ray, President, Nebraska Alcohol Fuels Corporation. Telephone interview. 27 September 1983.

Hauser, Robert J., and John B. Braden. Economic Impacts of Corn Utilization in the Sweetener and Fuel Alcohol Industries. (Prepared for the Illinois Corn Growers Association, Bloomington, Illinois), June, 1982.

Hayden, F. Gregory. "An Analysis of the Low Income Weatherization Program's Impact on the Nebraska Economy and on State Taxes Collected." In Nebraska Energy Futures: A Time for Choices. (Nebraska Legislative Council Committee Report No. 272, Supplement.) January, 1980, pp. 239-257.

Hertzmark, Donald I. A Preliminary Report on the Agricultural Sector Impacts of Obtaining Ethanol from Grain. (Prepared by Solar Energy Research Institute, Golden, Colorado for U.S. Department of Energy.) July, 1979.

Hertzmark, Donald, et. al. Economic Impacts of Ethanol Fuels from Crops. (Prepared by Solar Energy Research Institute, Golden, Colorado for U.S. Department of Energy.) August, 1981.

Hertzmark, Donald, et. al. The Agricultural Sector Impacts of Making Ethanol from Grain. (Prepared by Solar Energy Research Institute, Golden, Colorado for U.S. Department of Energy.) March, 1980.

Indiana Department of Energy, Office of Alcohol Fuels. Fuel Alcohol Opportunities for Indiana. August, 1980.

Information Resources, Inc. "Alcohol Fuels Industry Report." Washington, D.C., 21 January 1983.

Ingle, M.A. *Nebraska Biomass Study: Nebraska Agricultural Resource Base Assessment.* (Prepared for Nebraska Energy Office, Lincoln, Ne.) September, 1981.

Johnson, R. Channing. *Energy from Biomass: The Implications of Gasohol from Corn.* (Prepared by the MITRE Corporation, McLean, Virginia.) December, 1980.

Kentucky Department of Energy, Office of Policy and Evaluation. *The Kentucky Alcohol Fuel Industry: An Economic and Fiscal Impact Analysis.* January 1982.

Lamphear, F. Charles. "1976 Nebraska Input-Output Tables." unpublished.

Lamphear, F. Charles. "1977 Nebraska Input-Output Tables." unpublished.

Lamphear, F. Charles, and Theodore W. Roesler, *Analysis of Irrigated Agriculture on Nebraska's Economy, 1967-1970. Nebraska Economic and Business Report No. Eight.* Lincoln, Ne.: Bureau of Business Research, University of Nebraska-Lincoln. September, 1974.

Lamphear, F. Charles, and Theodore W. Roesler, *1970 Nebraska Input-Output Tables*, Nebraska Economic and Business Report No. Ten. Lincoln, Ne.: Bureau of Business Research, University of Nebraska-Lincoln. 1975.

Mehta, Bob, Vice President and Project Coordinator, American Development Corporation. Telephone interview. January, 1982.

Miernyk, William H. *The Elements of Input-Output Analysis.* New York: Random House. 1965.

Milton, David L., et. al. *Gasohol Feasibility Study.* (Prepared by Development Planning and Research Associates, Inc., Manhatten, Kansas for Energy Research and Development Center, University of Nebraska-Lincoln.) July 1978.

Nebraska Agricultural Products Industrial Utilization Committee. "Grain Alcohol: A Growing Industrial Opportunity in Nebraska." (conference proceedings) Lincoln, Ne., 6 November 1980.

Nebraska Department of Economic Development, Research Division. The Ethanol Distilling Industry: An Industrial Opportunity In Nebraska. March 1980.

Nebraska Department of Economic Development, Research Division. Wet Corn Milling: An Industrial Opportunity In Nebraska. March 1980.

Nebraska Department of Labor. "County Labor Force, 1982." unpublished data, 1983.

Nebraska Department of Revenue. 1979 Annual Report.

Nebraska Department of Revenue. 1980 Annual Report.

Nebraska Department of Revenue. 1981 Annual Report.

Nebraska Energy Office, Annual Report, 1982.

Nebraska Energy Office, Energy and Nebraska. June 1983.

Nebraska Energy Office, First Quarter Report. 15 May 1982.

Resource Economics and Management Analysis, Inc., Input-Output Analysis: An Introduction. Lincoln, Ne., 1982.

Ritz, Philip M. "The Input-Output Structure of the U.S. Economy, 1972." Survey of Current Business Vol. 59, no. 2 February, 1979.

Solomon, Barry D. "Gasohol, Economics, and Passenger Transportation Policy." Transportation Journal Vol. 20, No. 1, Fall 1980, pp. 57-64..

South Carolina Energy Research Institute. Fuel Ethanol and South Carolina: A Feasibility Assessment. (Prepared for South Carolina Governor's Divison of Energy Resources.) July, 1980.

U.S. Department of Commerce, Bureau of Economic Analysis. "Detailed Input-Output Commodity Composition of Personal Consumption Expenditures, 1972."

U.S. Department of Energy, Office of Alcohol Fuels. Analysis of Impacts of Ethanol Production in 48 States. (Prepared by Resource Planning Associates, Inc.) September, 1981.

U.S. Department of Labor, Bureau of Labor Statistics, "Estimates of Nebraska NonFarm Employment Data, Job Count - Workers by Industry," BLS 785, unpublished, September 12, 1983.

U.S. National Alcohol Fuels Commission. Ethanol: Farm and Fuel Issues. (Prepared by Schnittker Associates, Washington, D.C.) August, 1980.

U.S. National Alcohol Fuels Commission. Fuel Alcohol: An Energy Alternative for the 1980s. Washington, D.C.: Government Printing Office. 1981.

U.S. National Alcohol Fuels Commission. Fuel Alcohol: Report and Analysis of Plant Conversion Potential to Fuel Alcohol Production. (Prepared by Davy McKee Corporation, Chicago, Ill.) September, 1980.

Mr. DASCHLE. Thank you very much. Nebraska has been a tremendous leader nationally, and of course in this region. We've looked to you for guidance and for the kind of leadership that you've demonstrated. Historically, Nebraska has been in the forefront and I applaud you and the Gasohol Commission for that kind of foresight and leadership.

Our next witness is the executive director of the Nebraska Corn Growers' Association, H. Jack Moors. Mr. Moors, thank you very much for coming. We're delighted you're here and you can proceed with your abbreviated statement.

STATEMENT OF H. JACK MOORS, EXECUTIVE DIRECTOR, NEBRASKA CORN GROWERS ASSOCIATION

Mr. MOORS. Thank you, Congressman. I'll be very brief in our statement. I'm here to testify on behalf of the Nebraska Corn Growers Association, and I also would like to advise you that the National Corn Growers have also submitted to you a written testimony.

We are most appreciative of the exemption of ethanol fuel from the excise tax. We currently have under consideration in the State of Nebraska 5 to 6 large capacity ethanol production plants. Based on the data we have collected, it has a potential consumption of 20 million bushels of corn out of our region.

The Corn Growers of Nebraska wish to express their deep concern that we'll be able to keep the 6 cents Federal exemption from the excise tax on fuel. We feel it is paramount as an incentive to the encouragement of the production of ethanol.

By creating such a stable demand for grain in our State, we are obviously increasing our income to our farmers, and other agricultural employees and for persons employing and providing the necessary machinery and supplies for us to farm. Obviously, we hope that the increased demand requirement could bring some form of a small increase in our corn price. Of course, we're constantly wishing for that no matter what we do.

But very briefly, I'd like to give you some facts that we put together as a goal. The National Corn Growers and the various corn growers associations of which there are 17 in the country, our goal at some point in time is to see 1 billion bushels of corn worked in the ethanol production.

A billion bushels of corn would produce 2.5 billion gallons of alcohol. If we retained a 10-percent ethanol fuel type, this would mean that 25 percent of all our fuel would have ethanol in it. It would also mean a 62.5-million-barrel reduction in imports. Also 36 thousand bushels of corn in production in ethanol in production would produce one job. If you convert 1 billion bushels of corn, this, in turn, converts to 28,000 jobs.

A 1-gallon-capacity plant costs $2 in capital costs or investment. Based again on 2½ billion gallons of fuel, this is equal to $5 billion in capital investment in the United States. But the most important thing, Congressman, is the fact that this would consume 12 percent of the U.S. corn crop and I don't think any of us have to go into any great discussion of what importance this is to the corn growers in the United States.

We thank you for your time. We thank you for your continued consideration, and we hope you will continue to support the exemption as is.

[The prepared statement follows:]

STATEMENT OF H. JACK MOORS, EXECUTIVE DIRECTOR, NEBRASKA CORN GROWERS ASSOCIATION

Members of the committee, ladies and gentlemen, I am here on behalf of the Nebraska Corn Growers Association which endorses the three main tax provisions which provide incentives for the production and use of alcohol fuels. We currently have under consideration in the State of Nebraska, five to six large capacity ethanol production plants. Based on data we have collected, it has the potential consumption of 20+ million bushels of corn out of our region. The corn growers of Nebraska wish to express their deep concern that we be able to keep the 6¢ federal exemption from the excise tax on fuel. We feel that it is paramount as an incentive to the encouragement of the production of ethanol. By creating such a stable demand for grain in our state, we will obviously increase income for our farmers and other agricultural employees and for persons employing and providing the necessary machinery and supplies for us to farm. Obviously, we would hope that the increased demand for corn in our area would also bring a small increase in corn prices.

In a recent editorial in the Omaha World Herald, it was pointed out that the increased usage of alcohol blend gasoline since its inception has had a definite impact on our corn market.

This year our National Corn Growers Association states that fuel ethanol production will utilize 170 to 200 million bushels of domestic corn. To better comprehend the impact of the market, consider that the Soviet Union, one of our country's most important grain customers, has said it will purchase about 230 million bushels of U.S. corn this year. Planned corn purchases by the European Economic Community in 1984 are expected to total no more than 175 million bushels. There can be no question that the importance of the ethanol market for corn is gaining in comparison to traditional outlets for the commodity which means so much to us here in the midlands. The prospects for a continuing increase in production of fuel ethanol appear good to us. The alcohol outlook newsletter reported that fuel ethanol sales were higher in April of 1984 than in April of 1983 and are expected to continue to climb. We note in some states that the increased sale are anywhere from 50 to 200% over the 1983 levels. During this period of time, it is also worthy to note that fuel purchases in the United States have remained relatively stable. Fuel ethanol production capacity continues to climb as more plants are being built.

Let's go back and discuss the economic impact on Nebraska of the construction of new plants. The construction operation of a fuel grade ethanol facility in Nebraska will have various positive net impacts on the state's economic condition. These include increased employment of personnel, income revenues, and an increase in state tax revenue. In addition, the production of ethanol from Nebraska-produced grain will allow the state to capture the value added tax by manufacturers which will generate significant primary and secondary economic activity for us. The improvement in the state's balance of trade will generally continue to make Nebraska a healthy economy.

We feel that exemption of alcohol fuel from the excise tax can bring these strong economic conditions to our state. We hope that you will continue to give this your consideration.

We thank you for your time and ask for your continued support.

Mr. DORGAN. Well, thank you very much for the testimony, Mr. Moors.

Next, we have Dr. Alfred Hotz, Professor Emeritus of International Relations at Augustana College in Sioux Falls. Professor Hotz, we would like to receive your testimony.

STATEMENT OF ALFRED J. HOTZ, PH.D., PROFESSOR EMERITUS OF INTERNATIONAL RELATIONS, AUGUSTANA COLLEGE, SIOUX FALLS, SD

Mr. HOTZ. Thank you, Mr. Chairman, members of the committee, and my colleagues at the panel.

I hope you can understand me with a little bit of bronchitis. Can you hear now, better? All of the data so far and explanations and explorations done by these experts has dealt of course more with what I would call, as an international relations expert, the domestic aspects of it.

I think a great dimension that we have neglected—and I'm sure you haven't in your thinking, but I would like to share with you a few views about the international impact and the international extravaganzas that are now occurring and which will occur which will, in turn, have an effect on crude petroleum here whether imported or developed, or equally, then, ethanol as an alternative.

Among these scenarios, I start with the very simple assumption after having extrapolated all data and details from various studies, that we experts have access to and which we feel have been very competent and qualified in the past.

The first scenario, of course, is the obvious one: That in the bipolar conflict with the Soviet Union to come. Petroleum, more even than military hardware because it's going to be in short supply, will be the critical factor in both American domestic and international politics, whether it be for civilian usage, industrialization, military hardware, or support of our allies.

A corollary assumption arises from the increasing demand for oil products by both advanced and underadvanced industrialized countries and that the gradual decrease of total petroleum production is already beginning to show through calculated obsolescence.

The third assumption that arises therefrom and most important, in my judgment, is that oil has been politicized. This has been true ever since the imperialist nations were broken after World War II, like the Anglo Iranian Oil Co., the British Dutch Shell Co., Aramco, meaning Saudi Arabia American, into the national states themselves. The control—therefore pricing—created a new political situation, vis-a-vis politics and oil, that America must definitely look toward, as we face the power struggle based on oil.

The United States, as you well know better than I, is highly energy vulnerable since we have 97 percent dependency on oil as a mobility fuel, transportation, et cetera. To be sure U.S. oil exports, mostly from the volatile Middle East, constitute only 33 percent, but let's not forget that Western Europe imports 70 percent of its oil requirements from the Middle East—Iran 60 to 75 percent—which authoritative journals you use and ironically enough, Japan imports most of its from Iran.

About 50 percent of the known recoverable resources in oil reserves, just about 90 percent of the world's surplus productive capacity, are located in the Middle East Persian Gulf Basins. It is precisely because of these international oil factors that President Reagan has repeatedly said what? The Middle East is a vital national interest.

The United States should not discount, of course, that certain, what we call Third World countries like Nigeria and Africa and, or Mexico and others in Latin America are beginning to produce oil, but let me assure you that those Third World countries who are producing oi,l or will produce oil in the future, their first customers will be their fellow Third World nations who are trying to industrialize.

Or, put more simply, the United States will be at the low bottom pole. Yet perhaps the most vital factor, or more vital factor of this whole complex syndrome, because you're allowing me such a short time—I can't go into all of it—is the alarming uncertainty in the Middle East, a political military strategy for that troubled area the omnipresent American contingency plan is ineluctably required.

Thus, for instance, a new American diplomatic military strategy must be designed to bring peace, if possible, between Iraq and Iran. Or, alternatively, a military coalition with arms supplies, naval units, air-bases, whose mission is to guarantee Western—not just American—Western access to the necessary oil resources in the Middle East.

Perhaps even an Arab/United States strategic cooperation may require some delicate negotiations with our Israeli allies. But we're going to have to have more of the Arab/United States direct military strategic cooperation.

The worst case that I would like to bring to you, and it's already appearing if you're watching carefully, is Khomeini and his Islam fundamentalism with fanatical theological religious fervor against other Moslem sects, all of whom are in the Middle East Basin.

If Mr. Khomeini and his followers—and they're a strong bunch of boogers, I can assure you—through political terrorism, through subversion, through sabotage of existing oil infrastructure, are even limitedly successful, the amounts of oil from the Middle East, despite our Navy and everything else, would be diminished by over half.

This committee, as I see it, even as a subcommittee, of the big Ways and Means Committee, and all committees that are somehow irretrievably interlocked with the international aspects of American total strength—of which oil is a vital, vital, vital point—should begin to think of that future which is so uncertain, and obviously, alternative fuels like ethanol play a part in that total calculation.

Thank you and I'm awful sorry about my voice.

[The prepared statement follows:]

Statement of Dr. Alfred J. Hotz, Professor Emeritus, Augustana College

PERSIAN GULF STRATEGIES: OIL

The several scenarios that I wish to share with you are based upon extrapolation of data (facts-and-figures) as documented by professional experts, the Petroleum Institute (Washington), and by comprehensive reports emanating from the Center for Strategic Studies (Georgetown University).

Thus, I commence with the "basic assumption" that, as we anticipate Bi-Polar conflicts in the future, petroleum is the critical factor in both American domestic and international policies (civilian usage; industrialization; military hardware; and support of our Allies).

A corollary "assumption" arises from the increasing demand for oil products by both the advanced industrialized nations and the Third World, countered by a gradual decrease in total world petroleum production by virtue of a "calculated obsolescence".

The third assumption is premised upon the unalterable fact that oil has been increasingly politicized—since the original "nationalizations" of oil sources by nation-states taking complete control from the former Imperialists (Anglo-Iranian Oil; British-Dutch Shell; ARAMCO; etc.). The famous/or infamous Oil Embargo (1973) by OPEC was a recent evidence of such politicalization. The more recent Iraq-Iranian War adds new dimensions to the world's "power struggle" through oil.

The United States is highly energy-vulnerable, since we are 97% dependent on oil as a mobility fuel. To be sure, the U.S. oil imports, mostly from the volatile Middle

East, constitute only 33%. However, Western Europe imports 70 percent of its oil requirements; and Japan Imports (from 70–60 percent) mostly from the Middle East (Iran, ironically enough).

Moreover, about 50 percent of the known recoverable oil reserves, plus 90 percent of the world's surplus productive capacity are located in the Middle East-Persian Gulf basins. It is precisely because of this oil configuration that President Reagan warned that the Persian Gulf is an American "vital interest".

The U.S. should not discount prevailing-and-future oil imports from Africa (Nigeria and Sub-Sahara) or/and Latin America (Mexico, Venezuela, Caribbean area, etc.) Yet, much of the dramatic increasing demand for energy imports will be by this same Third World, natural customers of the aforementioned nations, with America being low on the totem pole.

Yet a most vital factor of the complex syndrome herein outlined, is the alarming uncertainty in the Middle East. A politically-military strategy for that troubled region, beyond present American contingency plans, is ineluctably required.

1. Thus, a "new" American diplomatic-military strategy must be designed a) to find, if possible, a peaceful solution to the Iraq-Iranian war; or b) alternatively, a coalition of American and the moderate Arab states, with co-ordinated arms supplies, naval units, and air bases, whose mission is to guarantee western access to the necessary oil resources. Perhaps this Arab-U.S. strategic cooperation may require a U.S. review of its relations with Israel. Should the Iraq-Iran War continue more dangerously, and Iran halt shipments to Japan, the United States must be prepared for such contingency.

2. A "worst case" scenario may tragically hurt American national interests through future oil disruptions. Already in progress is the Ayatolla Khomenini's fanatical, ideological, theological war against the other Moslem sects (Sunni, Shiites, etc.) in the Middle East. The export of the Islam Fundamentalism by subversion, combined with political terrorism, with sabotage of the oil infrastructures, if successful, would alter drastically the political-economic equation in Saudi Arabia, Kuwait, Qator, Bahrein, the Emirates, etc. Oil exports to the West would diminish.

This Committee Hearing should, in the long-range National Interest of the U.S.A., undertake a sober, serious, mature look at the future Fuel Crises to come; and what role Alternative Fuels may play within these new parameters.

Mr. DORGAN. Dr. Hotz, thank you for the testimony and for providing us a very different perspective of about this issue today, and we appreciate even with the laryngitis, your willingness to come and present your statement.

Next, we would like to ask Professor Paul Middaugh to provide us some of his thoughts, and if you would abbreviate your thoughts, I would appreciate it. Professor Middaugh?

STATEMENT OF PAUL R. MIDDAUGH, PRESIDENT/CONSULTANT, MIDDAUGH & ASSOCIATES, INC., BROOKINGS, SD

Mr. MIDDAUGH. Thank you, Mr. Chairman. I will submit for the written record most of my remarks.

For the past 4 years, I've been a self employed alcohol fuel consultant employed incidentally primarily in Japan, Indonesia, Sumatra, Australia, and now currently in the Caribbean.

I'd like, however, to address my few remarks to the maturing technology. I do support the continuation and expansion of the excise tax exemptions as has been discussed so much. I will not go into those at all.

I would like to comment that some years ago, approximately 35 years ago, I worked for a beverage alcohol firm that made alcohol for Smirnoff Vodka. There was no saving of fuel; we blew the steam out through a hole in the wall; we did not use any heat exchangers; the process was terribly inefficient from an economic and from a cost and energy process basis.

Today's plants have modern technology with a new energy efficient revolution in technological control. I was able to demonstrate in the Caribbean for the past 2 weeks a highly improved processing technique using new enzymes, new yeasts that can ferment at over 100 degrees Fahrenheit with high yields, and particularly smaller scale technology for what I call a community or elevator type sized plant which is my major area of interest.

This new technology has reduced the energy cost and therefore the economic cost of processing by more than 50 percent. This means that if you go to a banker, you can then talk about more cost-effective processing which would have a greater return on your investment in a shorter time as one of the great advantages for working with the new alcohol technologies.

I would commend Kathleen Graf for her testimony on a small plant, and point out to her that she has indeed shown excellent capability, which has not been the case for most of the small alcohol plants that I have observed in the past 4 years. The maturing technology, the improvement in processes which has not been addressed before at this meeting, is a significant increase in the viability of the potential for smaller community sized elevator sized alcohol process plants in the rural area. The alcohol would be used in the rural area and the animals fed with the side products which are the protein feeds and potential human food if this should be encouraged.

The biggest problem right now is a need for technical training and technical support on how the process works.

I would like to thank the gentlemen from Congress' Ways and Means Committee and I'll submit the rest for the record.

[The prepared statement follows:]

STATEMENT OF PAUL R. MIDDAUGH, PRESIDENT, MIDDAUGH & ASSOCIATES, INC., BROOKINGS, SD

Thank you for the opportunity to submit testimony as an international consultant on processing corn and grains to protein concentrates for feed & food with ethyl alcohol fuel as a co-product.

I wish to support the four objectives described by Congressman Tom Dashle:

1. To increase the Federal alcohol fuel excise exemption.
2. To legislate a strategic fuel alcohol reserve.
3. To urge the administration to use existing authority & funds to assist funding of fuel alcohol production facilities.
4. To insert into the 1985 Farm Bill a strong provision to encourage conversion of grains to protein feed and food concentrates with co-production of fuel ethanol.

Major petroleum and starch processing firms have built multi-million dollar fuel alcohol and co-product protein feed concentrate production plants. More than 500 million gallons of anhydrous fuel ethanol is being produced from corn and grains in 1984, usually in plants producing 50–60 million gallons of fuel alcohol at 112 octane, which is used to boost low octane gasoline anti-knock ratings. These plants are highly efficient and cost effective.

Rural cooperatives including elevators, etc. have large, local supplies of damaged, or high moisture grains which could be used to concentrate protein for animal feeding by production of fuel ethanol.

I know of many farm scale plants which failed becaue of:

1. Underfunding—lack of funds for construction, and especially for operation of up to a year without cash income.
2. Lack of engineering for process efficiency.
3. Lack of technical and managerial knowledge for efficient plant operation.
4. Lack of marketing support and knowledge to market the protein and alcohol fuels.

I know of significant process improvement since 1980 which can reduce the cost of construction, cost of labor for operation and cut the cost of processing energy in half by improved processing to produce anhydrous fuel ethanol from starch crop wastes and undergrade crops.

Improved enzymes, and alcohol and temperatue tolerant yeasts can produce fermentation ethanol with at least 92% efficiency. The alcohol can be concentrated by distillation and dehydration through adsorption of remaining water by use of molecular sieves to reduce the energy and processing cost by half. Microprocessor controllers can reduce labor and maintain constantly high process efficiency.

Small plants producing 500,000 gallons per year can be efficient, profitable producers of protein feed concentrates and anhydrous fuel alcohol. Legislation by the Congress can help our farmers and help the United States.

Mr. **Dorgan**. Professor, thank you very much for on short notice coming up and presenting your statement and we appreciate the statements on part of all of the panel members.

We are—following this panel, we have one or two other requests for brief testimony which we will honor. Let me call on Congressman Jacobs. Do you have any questions? Alright, Congressman Daschle?

Mr. **Daschle**. Thank you, Mr. Chairman. Doug, did you have any additional comments that you wanted to make. You came in when——

Mr. **Snyder**. Yes. I have a couple of points that would be appropriate that I would like to interject at this time.

Mr. **Daschle**. Please, go ahead.

STATEMENT OF DOUG SNYDER, ARCHER DANIELS MIDLAND CO., DECATUR, IL

Mr. **Snyder**. Mr. Chairman, Congressmen, thank you for having me here. I have submitted a formal comment for the record. However, I'd like to summarize about three quick points.

First off, my name is Doug Snyder. I'm assistant to the vice president for the Archer Daniels Midland Co., out of Decatur IL.

The first observation that I'd like to make is that the incentives are working. The basic comments that Dr. Middaugh made are correct but in a more specific fashion, I'd like to note that in our current operation, the technology that we are using does not closely resemble the technology that we were employing 6 years ago in an operation producing industrial and potable alcohol.

Among innovations that have been incorporated are continuous grain fermentation, a significantly enhanced distillation system, a sharply reduced production time, and substantial energy efficiency gains.

Specifically, new yeast strains and the continuous process have caused fermentation time to be reduced by one-third the previous time and the British thermal units required for production have been cut to one-seventh of the original requirements on a per-gallon basis. It's worth noting, I believe, that in 1983 the USDA and DOE issued a joint statement pointing out that by their findings, the efficiency of fuel ethanol production was at least 1.5 to 1. Our own numbers would indicate that those are extremely conservative numbers.

The second point that I'd like to make which we often times take for granted is that the singular reason why ethanol has developed in the marketplace as it has is the fact that it works. Ethanol blends have been approved by the Environmental Protection Agency and the 10-percent blends have received warranty approval from virtually every major domestic and foreign auto manufacturer marketing automobiles in the United States.

This acceptance will result in the marketing of nearly 500 million gallons of ethanol this year, or using approximately 200 million bushels of corn.

The third point that I would like to comment on is somewhat of a concern, but I think one that needs to be addressed. While marketplace and technological developments have allowed the industry to make a significant contribution to the agricultural and overall economy of the United States, the industry future is clouded by the overhanging presence of highly subsidized Brazilian alcohol which is subsidized even further to overcome U.S. public policy support for domestic production.

In reality, the threat on United States ethanol can be traced to the European community. While we provide costly defense support to Europe with U.S. dollars, the EEC diverts their resources to finance massive subsidies such as paying farmers 27 cents per pound to produce sugar and then subsidize that sugar into the export market forcing that market down to 5 cents per pound.

The impact is to smash the economies of developing nations, many of which are former European colonies who must export their sugar in competition with EEC sugar at approximately one-quarter the actual cost of production.

As a result, Brazil and many other countries are transforming massive amounts of sugar produced with their own subsidies into alcohol. With below-market rate loans from western banks and the World Bank, Brazilian distilleries are constructed and exports are subsidized. The alcohol is produced and is being shipped to the United States at a price which would equate to roughly 70 cents per bushel of corn, if you were to produce it from corn and compete with that product. What is concerning is that some people in the United States suggest that supporting Brazilian imports of alcohol in direct competition with U.S. production is in the best interests of the United States.

From a national security standpoint, U.S. ethanol provides a fuel which cannot be embargoed. During the last Arab oil embargo, the Brazilian Government immediately embargoed the exporting of their ethanol. It should also be noted that while the Brazilians question our policies, they have a 160 percent ad valorem tax on imported ethanol and in recent times they have totally prohibited ethanol imports.

The ultimate resolution of this problem will play a major role along with the overall economics of ethanol as to what if any growth limitations this industry will face.

Thank you.

[The prepared statement follows:]

STATEMENT OF DOUG SNYDER, ASSISTANT TO THE VICE PRESIDENT, ARCHER DANIELS MIDLAND CO., DECATUR, IL

I'd like to thank you for the opportunity to speak with you today about the technological developments within the fuel alcohol industry. The Archer Daniels Midland Company is an agricultural processing firm with corporate headquarters in Decatur, Illinois. The company is involved in the acquisition, storage, transportation and processing of a variety of agricultural commodities.

As a major producer of high fructose corn sweeteners, the company has operated corn wet milling facilities since 1972. In 1977 the company opened the first new distillery in the United States. In nearly 20 years at our Decatur, Illinois location. At the time of construction, the facility employed highly sophisticated electronic controls, however the basic fermentation technology was essentially unchanged from decades of potable alcohol production. While the plant was designed to produce beverage and industrial ethanol, the company noted in its 1976 annual report that energy price increases could one day lead to the use of ethanol as a fuel additive.

In June of 1978, the state of Iowa approached the company to supply a limited amount of ethanol for a test marketing program of "Gasohol." Since that time, changes in petroleum prices, increasing octane needs in gasoline and the establishment of a clear national policy toward alternative fuels development have resulted in the expansion of fuel ethanol on a national basis. ADM has participated in that expansion by converting the Decatur facility to fuel ethanol production and expanding its capacity. Additionally, the company has added alcohol to the Cedar Rapids, Iowa plant and has expanded production in Peoria, Illinois. Currently the company has a capacity to produce 300 million gallons of ethanol annually, however the company's Peoria operation is shut down due to economic constraints.

As I mentioned earlier, when the Decatur ethanol plant was constructed, it employed state-of-the-art technology. However, it is important to recognize that the advent of "fuel ethanol" signaled the introduction of a new product. Unlike previous fermentation objectives, fuel fermentation produces a product in which color, taste and smell are not significant factors. Therefore, previous constraints on technology because of the unacceptability of the end product offerd potentially new technologies in this industry.

In our current operations, the technology does not closely resemble the technology of 6 years ago. Among the innovations incorporated are continuous train fermentation, significantly enhanced distillation, sharply reduced production time and substantial energy efficiency gains. Specifically, new yeast strains and the continuous process have caused fermentation time to be reduced to one-third the previous time, and the Btu's required for production have been cut to one-seventh of the original requirements per gallon. It is worth noting that in 1983 the USDA and DOE issued a joint release which showed their findings of the energy efficiency of fuel ethanol production to be at least 1.5 to 1 in favor of alcohol. Our own numbers today would actually be far greater than this.

These innovations have occurred in only 5 years but more importantly, they represent the ability of American industry to respond to the demands of market pull through the development of more efficient technology. The result is best exemplified by a simple comparison.

In 1978 when ADM supplied Iowa's test market, alcohol sold in the $1.50 per gallon range, gasoline was $0.35. While gasoline today has fallen from its high in excess of $1 per gallon wholesale to current levels of 70 to 80 cents, alcohol is still in the $1.50 per gallon range.

While no one can say what specific technological advancements will occur in the next 5 years or what might happen to gasoline prices, the incentive for improved technology exists. New distillation technology, newer yeasts and enzymes are all being worked on.

It is clear, that the industry development to date has been the result of a long-term commitment of U.S. policy to assist alcohol fuels in achieving their full potential contribution to the U.S. economy. This policy is best exemplified by the recent 1 cent increase in the Federal alcohol fuels exemption as part of the Budget Reduction Act of 1984. Other steps taken by the Government include special investment tax credits and research and development of new technologies by the U.S. Departments of Energy and Agriculture.

As a side note, an early concern about fuel ethanol was the question of food versus fuel. It should be noted that fuel ethanol is produced from corn only after 1.7 pounds of edible corn oil, 12.5 pounds of 21 percent protein gluten feed and 3 pounds of 60 percent protein gluten meal, which is enough protein to raise 3 chickens to market, has been removed and returned to the food and feed chain. In addition, at our Decatur facility over 20,000 heads of fresh lettuce are harvested daily as a result of alcohol production. The low grade heat and carbon dioxide produced in the alcohol process provide all the heat and a growth stimulant for the hydroponics operation. As an example of the food efficiency of our operations, at capacity, over 200 million pounds of corn oil would enter the food chain each year that would otherwise have been fed to livestock.

The market for fuel ethanol has also experienced significant changes. "Gasohol" was originally used to diferentiate ethanol blends from gasoline and ethanol's primary attribute was its 10 percent extension capability during fuel shortages. Today ethanol is a recognized octane booster used to produce high octane gasolines. While it will always be an extended in times of shortage, its octane boosting qualities have clearly established its value in the market as well as at the refinery for producing high octane unleaded fuels and as an environmentally benign alternative to tetra ethyl lead.

This acceptance by the petroleum industry has been made possible by the singular fact that the fuel works. Ethanol blends have been approved by the environmental protection agency and 10 percent blends have received warranty approval from virtually every major domestic and foreign auto manufacturer marketing auomobiles in the United States. This acceptance will result in the marketing of nearly 500 million gallons of ethanol in 1984 requiring nearly 200 million bushels of U.S. corn, nearly equal to the Soviet market for corn.

As mentioned previously, ADM operates alcohol facilities in Decatur, Illinois and Cedar Rapids, Iowa. In addition, corn wet milling facilities in Clinton, Iowa and Montezuma, New York offer the potential for the addition of ethanol plants. Should the economics of ethanol production warrant, the company is ready to add fuel ethanol to those facilities and could increase total capacity by as much as 50 percent.

While market place and technological developments have allowed the industry to make a significant contribution to the agricultural and overall economy of the United States, the industry future is clouded by the overhanging presence of highly subsidized Brazilian alcohol which is subsidized even further to overcome U.S. public policy support for domestic production.

In reality, the threat on U.S. ethanol can be traced to the EEC. While we provide costly defense support to Europe with U.S. dollars, the EEC diverts their resources to finance massive farm subsidies such as paying farmers 27 cents per pound to produce sugar and then subsidize its export forcing world prices down to 5 cents per pound. The impact is to smash the econimies of developing nations, many of which are former European colonies who must export their sugar in competition with EEC sugar at one-quarter the actual cost of production.

As a result, Brazil is transforming massive amounts of sugar produced with their own subsidies into alcohol. With below market rate loans from western banks and the World Bank, Brazilian distilleries are constructed and exports are subsidized. The alcohol produced is being shipped to the United States at a price which would require 70 cents per bushel corn to compete in the U.S. market. What is concerning is that some people in the United States suggest that supporting Brazilian imports of alcohol in direct competition with U.S. production is in the best interest of the United States.

From a national security standpoint, U.S. ethanol provides a fuel which cannot be embargoed. During the last Arab oil embargo the Brazilian Government embargoed the exporting of their ethanol. It should also be noted that while the Brazilians question our policies, they have a 160 percent advalorem tax on imported ethanol and in recent times they have totally prohibited ethanol imports.

The ultimate resolution of this problem will play a major role along with the overall economics of ethanol as to what if any growth limitaitons this industry will face.

Mr. **Daschle**. Doug, thank you very much. The members of this panel in particular, obviously not to the exclusion of past panels, are people that really represent the pioneers of the industry.

Paul Middaugh is a person who really brought the alcohol fuels industry into the modern age in South Dakota. The companies that you represent, Barry and Doug, are pioneers also.

I think the feeling in the last couple of years has been that the alcohol fuels industry has stagnated. The fact of the matter is is that you've grown and you've grown with leaps and bounds. Were it not for the kind of dedication and leadership you've shown, that would not have been possible.

Barry, what kind of impact do you think the new energy plant will have in South Bend? Just describe for me briefly what you think will happen.

Mr. **Direnfeld**. Recently both political parties have been discussing new ideas for industrial development. They should look at ethanol and its impact on industrial development. Let's look at the impact new energy has had on the economy of South Bend, IN.

The city of South Bend has a very strong but stagnating industrial base. Studebaker has left; Bendix has been reducing its work force. The result has been high unemployment and a stagnating economy.

Ethanol, however, is perfectly suited to be produced in South Bend because it utilizes highly trained workers who are used to industrial facilities. This is illustrated by the fact that a factor in new energy's project being ahead of schedule is the productivity of our construction workers. To date, New Energy has already spent $70 million of outside capital, that's imported capital into the South Bend area, for construction labor, for goods and services during our 2 years of construction.

A University of Indiana study has estimated between 800 and 1,000 new jobs will be created by our project in the South Bend area. Jobs will be in trucking, farming, maintenance, fabrication, as well as direct on-site employment.

In addition to the availability of labor, South Bend is surrounded by corn fields. Each year New Energy will buy 20 million bushels of corn. Assuming a $3 per bushel price of corn, New Energy will spend $60 million a year for corn.

Therefore, New Energy's aggregate impact on the economy of South Bend, combines agricultural purchases with industrial development. It is a story that can be replayed in many, many areas throughout the Midwest.

Mr. **Daschle**. Would it have been possible without the tax incentive?

Mr. **Direnfeld**. Absolutely not. In fact, our company was created in direct response to the tax incentives. Even the threat to eliminate them almost destroyed our project. In fact if Congress had not voted to override the administration's recision request for loan guarantee funds, we would have been out of business. And, all the benefits I just discussed would not have been realized. The importance of continuing the subsidy currently mandated by law is critical.

Critical not only to New Energy, but critical in terms of created new projects. New Energy's project should only be the first phase of the alcohol fuel industry. Just as Doug has discussed, ADM has made many modifications to their process to reduce the cost of production. Some day our industry will be able to stand on its own and move from a transition industry to a stable one. It's important to nurture new technologies. New Energy has already made innovations over current productions.

And I hope the next phase of alcohol projects will learn from mistakes that we will undoubtedly make, and improve the alcohol production process. But to do that, the consistency in law is important.

Mr. **Daschle**. Continuing the tax incentive is what you're saying?

Mr. **Direnfeld**. That's correct.

Mr. **Daschle**. You can't exist without it? Is that what you're saying?

Mr. **Direnfeld**. That's correct. At this point it would be impossible to exist without it. Moreover, just as I think we can refine the process of producing ethanol, I think we can improve the method of subsidization by moving to federalization.

Mr. **Daschle**. What about that? Why is federalization more important than the State-by-State provisions we have today?

Mr. **Direnfeld**. Let's consider this situation. The State of Tennessee has decided to enact a State subsidy for ethanol, but the State of Wisconsin has chosen not to.

Even though Milwaukee is approximately 120 to 150 miles from my plant, it is more economical to ship the hundreds of miles to Tennessee. Even though this doubles or triples transportation costs, ethanol producers are forced to hopscotch around the country. Also State incentives, because of their vast number are more volatile thereby preventing rational marketing plans.

It's important to analyze where the predominant benefits of the alcohol program fall. Are they predominantly State benefits? With respect to economic development, I think yes. Surely, the State of Indiana will be getting tax revenues and jobs from New Energy, but if you look at the Federal benefits, they are predominant. Replacing PIK and other agricultural subsidies with a new domestic demand for corn is a Federal benefit. Allowing the United States to reduce oil imports is a Federal benefit.

Allowing the United States to have an environmental policy of reducing lead is a Federal benefit. On balance therefore, this program's benefits are predominantly Federal. I recommend that ethanol subsidization evolve from a State-by-State basis, which was fine in the early development, to a more unified Federal basis.

I think if you do that, you're going to see the full and quick response by the industry to get it to the level that we all hope for.

Mr. **Dorgan**. Doug, I'd like to just for the statement clarify something that you had said and you gave another perspective on it. You talked about Brazil and it's use of cane to produce alcohol and the reasons for doing that. The other perspective, one which I happen to believe, is not that we are creating undesirable subsidies and therefore throwing them into the world market and ruining the third world sugar markets. The alternative of that is that we are the only major industrial Nation that doesn't operate on long-term contract with other nations for sugar production. The result is we've lost one-half of our domestic production in this country and decided therefore in order to have some basic staple production to have a sugar loan program.

It seems to me that one of the major reasons Brazil has moved towards increasing alcohol automobile fleet using cane as its feedstock, is its dependence on foreign oil and the incredible cost of that foreign oil which has necessitated their borrowing from Western banks which has put them and the banks in some serious jeopardy, and has lead Brazil to believe that it might be in their best interests to use solar power which grows the cane which produces the alcohol to run their fleet, so that's the other perspective, one that I share, that's slightly different than the one that you described.

Mr. **Snyder**. Well, if I could, for just a second, and I hope I was not misinterpreted. I don't believe that our international policy has caused that problem in Brazil. As I believe I pointed out, I believe it was the European community policy which has resulted in the world price of sugar being 5 cents in which case they don't have any option but to put that sugar out into the world market and sell it at 4.

Mr. **Dorgan**. That's the dump price for sugar; actually, the world price that is predominant is a contract price between countries that have relationships.

Mr. **Daschle**. I only have one other comment. I think Dr. Hotz provided an insight that was important here for one reason. You know we spend close to $280 billion a year on defense preparing for war. We're talking here about $225 million to prevent war. I think what you said is a very important message for this country. If we want to prevent war, if we want to take away those symptoms that could cause war, we're talking about the single best way to do that right here.

I applaud you for your eloquence and the kind of statement you gave us this afternoon.

Dr. **Hotz**. Thank you, Mr. Chairman. May I add the point though that I think when you're talking about war, you're talking about the bipolar conflict possible between Soviets and the United States.

I won't go into my thesis on that particular question. But I would want you to think about that what you should be concerned with as a Congressman and other things, is the fact that we have 267 wars at the present time right today at this very moment going on. Now, they're all, a lot of them are small ones, peanut wars if you know, or small guerrila wars. But the war between Iraq and Iran is, even though it isn't going on every day, is typical of what can happen in the Middle East to a greater degree. So from your standpoint, from my standpoint, you have pointed out and that's the only reason that I pointed up, is that we can talk about Brazil and what it does with ethanol; we can talk about the United States and what it should do. And I agree with all of it, but I'm concerned about the national security of the United States and I made a point which incidentally none of you picked up, and I'm worried about it. I said that actually oil will be more important in the next war than military hardware.

You can think about that for a while; it'd take me an hour to explain it but I'll be glad to.

Mr. **Daschle**. Not with that voice you won't for an hour.

Dr. **Hotz**. My voice has always failed me when I have been before brilliant people like you.

Mr. **Dorgan**. Oh, he's smooth; you have a delicate choice of words. Thank you very much to this panel for some excellent testimony which I think fits very nicely with the previous panels that we've had before us. Appreciate it.

That pretty much concludes the panels that we have scheduled to testify today. I would like to ask Congressman Jacobs if he has any statements that he would like to make.

Mr. **Jacobs**. Well, Mr. Chairman, I'd very much like to commend our colleague, Congressman Daschle. Tom gets people up early and makes them travel a long way to get to South Dakota. That's very rewarding not alone for this member of the committee but I think that the record has been enriched a great deal. It's probably worthy of note that when the subject of exemptions and energy credits comes before the Ways and Means Committee, I think it's fair to say it's usually given fairly short shrift and without the constant urgings of Congressman Daschle, I really don't believe it would have come as far as it did.

So, after this when I think of South Dakota, I'll think of Tom Daschle, and when I think of Tom Daschle, I'll think of South Dakota, and I'll give alot more thought to energy credit. Thanks, Tom.

Mr. DORGAN. For the record, let me point out that Birch Bayh, former Senator from Indiana, had called today and indicated that some statements in support of the development of the alcohol fuels industry are going to be submitted by some trade unions that he is working with on a number of issues and I know that he's called me in the past, and I know he's talked to you, Tom. Birch Bayh is among other things, working on alcohol fuels issues very aggressively so I wanted to note that in the record.

Congressman Daschle, do you have any remarks?

Mr. DASCHLE. Well, Mr. Chairman, I want to thank the panel members for what I believe to be a very educational day. Everytime you think you know just about all there is to know about a given issue, you learn from the real experts that there's much more out there and I'm grateful to each and every one for their contribution.

I can guarantee them that the Congress is going to be made fully aware of their information and the kinds of statements they provided here were excellent. In particular, I want to thank the Ways and Means Committee and the staff for the help that they've given us with this hearing and for making it possible. It is very rare for the Ways and Means Committee to hold a hearing anywhere in the country except Washington.

It isn't often they hold a full hearing. Budgets are limited and obviously time is even more limited. We're very grateful they could come to Sioux Falls and in particular I want to thank Andy Jacobs who has taken a day of his busy schedule to come and share this time with us. It's an honor for me to have him here.

I also thank our chairman, Congressman Byron Dorgan. They are without a doubt two of the finest Members in Congress in my estimation and obviously their dedication, their interest in issues such as this is vital to our success and it's a very momentous occasion to have them both here with us today.

To them, to our panel members, to the staff and to all of those who made this day a very major success, my sincere thanks.

Mr. DORGAN. Let me point out, Tom, as I did at the start, the hearing record for this hearing will remain open until August 17 and I would invite persons who are interested in submitting written testimony to submit it to the House Ways and Means Committee, in Washington, DC, if you write to the U.S. Congress, House Ways and Means Committee, Washington, DC, it will get there and reference this hearing.

So be aware that that will be open until August 17. And let me, in conclusion, also say that this hearing here in Sioux Falls is a result of Congressman Daschle's persistence. By that I mean that you need to find people who are interested in an issue and who will not let go. There are a lot of folks who have passing interests in a lot of different issues and they think about it for a while or do one or two things, and it's gone.

Tom has a persistent interest in alcohol fuels and he doesn't let go and I think that that not only has resulted in this hearing to be held in Sioux Falls today, the only hearing that we will hold around the country on this issue, but also it's that kind of compelling interest and dedication to this issue that will result eventually in Congress doing the right thing.

And I was pleased to be here in Sioux Falls and part of this hearing and we appreciate the courtesy that many of you showed listening to the testimony as long as you have, and we hope that if we can ever be of service to you in Congress, or on the House Ways and Means Committee, you'll get in touch with us.

With that, we would conclude the hearing for this afternoon, and thank you all for attending.

[Whereupon, at 2 p.m., the hearing was adjourned.]

[Submissions for the record follow:]

A STUDY PREPARED FOR THE AGRI FOOD AND FUEL COOPERATIVE BY NEBRASKA PUBLIC POWER DISTRICT, MARKETING DEPARTMENT

ECONOMIC ANALYSIS OF THE AFFC BENKELMAN ETHANOL PLANT (OPERATION PHASE)

I. Introduction, Project Description, and Study Area

The Agri Food and Fuel Cooperative (AFFC) is a producer cooperative consisting of farmers in northwestern Kansas, southwestern Nebraska, and east-central Colorado. To achieve the objective of the cooperative—to provide greater returns to the farmer-member for the grain he has grown—the AFFC plans to construct and operate a 30-million gallon per year alcohol producing facility. On July 23, 1981, the AFFC announced that the site chosen for the alcohol production facility was Benkelman, Nebraska.

The $85-million project will require a construction period of approximately two years. The total construction manpower required for the project is estimated to be 690 man-years, with the construction work force projected to reach a peak of 480 workers during the fifth and sixth quarters of the construction period.[1]

The analysis summarized in this report focuses on the economic effects of the AFFC alcohol plant during the operation phase of the project. During the operation of the facility, an estimated 101 persons will be employed, with an annual payroll estimated to be $2.4 million (1983 dollars). In addition to the plant payroll, the use of more than 12 million bushels of grain annually by the facility will have a significant economic effect on the area.

The plant's primary product, anhydrous ethanol, will be supplemented by the by-product, distillers dried grain. This product is a valuable high protein supplement for livestock.

The definition of the study area is important as the magnitude and geographic incidence of the socioeconomic effect is a function of the size of the study area. In this analysis, the commuting region constitutes the study area. The commuting region encompasses the area which is anticipated to receive the major share of the economic benefits stemming from the operation of the alcohol production facility.

The geographic delineation of the study area is illustrated in Map I-1. The political subdivisions within the study area which are anticipated to be recipients of the economic effects from the plant operation include the communities with a population of 500 or more. Table I-1 presents a list of the counties and communities in the study area which are expected to be the recipients of project effects.

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[1] For an analysis of the effects of the project construction phase, see Nebraska Public Power District, Marketing Department Report, "Socioeconomic Analysis of the AFFC Benkelman Ethanol Plant (Construction Phase)," February, 1982.

TABLE I-1—COMMUNITIES LOCATED IN THE STUDY AREA

STATE/COUNTY/COMMUNITY

Nebraska: Chase; Imperial, Wauneta.
Dundy; Benkelman.
Hitchcock; Stratton, Trenton.
Red Willow; McCook.
Kansas: Cheyenne; Bird City, St. Francis.
Rawlins; Atwood.
Colorado: Yuma; Wray, Yuma.
[The complete study has been retained in subcommittee files.]

STATEMENT OF D.R. PAUGH, PRESIDENT, ALCO, INC.

First let me describe Alco, Inc. and its interest in fuel alcohol mixtures (defined herein as 90 percent gasoline and 10 percent ethanol) and the impact of tax and other regulatory legislation which may affect this new business.

Alco, Inc., is a North Dakota Corporation which first became interested in producing ethanol from potatoes and other agricultural biomass early in 1978. It has worked for many years to develop what it believes to be the proper formula for developing an ethanol refinery and a new business in Grafton, ND. At this time Alco plans to begin construction of its new 4 million gallon per year ethanol refinery in September of this year and it expects to be in production in the fall of 1985. The refinery will use grain, cull potatoes, and other agricultural and food processing waste products as feedstocks. The cost of such a facility will be between 11 and 12 million dollars which is a significant investment in a business which is dependent upon legislation passed by Federal and State Governments.

Over the four and one half year period which I have worked on this project, as Alco's President, the Federal Government has served as the prime catalyst for developing the fuel alcohol business as it is today. First, the Federal Government solicited private business, such as Alco, to develop economic and technical feasibility studies which were based upon certain tax incentives developed in the public interest to foster the development of the fuel alcohol business in this country. Fuel alcohol mixtures were then, and continue to be, a partial alternative to shrinking domestic petroleum reserves and increased importation of foreign petroleum to this country. It is important, therefore, that the Federal Government continue to recognize its responsibility to this infant business, which it is primarily responsible for, until the business is mature enough to be independent. I would suggest that fuel alcohol mixtures continue to make good common sense and that it is in the long term public interest to support the development of renewable liquid fuel production within the United States and the resulting new jobs and required supporting businesses which stimulate economic development, especially in rural areas of the country.

Without certain tax incentives the fuel alcohol business as it is today, and as we hope it may evolve in the future, could not have been initiated except, perhaps, as an ancillary process to large scale plants where ethanol production could be combined with the manufacture, or processing, of other profitable finished goods (i.e. the Archer Daniels Midland business model).

Excise Tax Exemptions (Marketing).—It is imperative that fuel excise tax exemptions for fuel alcohol be provided by the Federal and State Governments to enable a viable marketing strategy to be developed providing the ethanol refiner, distributors and fuel retailers to have some financial incentive to process, distribute and market this liquid fuel resource to the public. These incentives must remain in place through 1992 as originally passed into law by congress.

Currently, with wholesale gasoline prices soft (some 17 cents per gallon less than 2 years ago), the 5 cent per gallon federal excise tax exemptions for fuel alcohol mixtures is marginal, at most, for plants who may be in a startup mode and not having their markets fully established. Additional fuel excise tax exemptions have been provided by many states, many with significant agricultural constituancies, to supplement the federal exemptions and provide the necessary financial incentives to market the fuel alcohol product.

The disparity in state fuel tax exemptions from state to state, however, creates added problems for the fuel alcohol marketer since product may have to be transported added distances to reach markets which are profitable or certain markets where fuel alcohol may be advantageous can be excluded. This also tends to regionalize the production locations and does not induce the most cost effective production network to supply this alternative liquid fuel to the public. It would be far better if the Federal Government would provide a larger fuel tax exemption to provide uniformity and a stabilizing effect upon the marketplace. Those states with supplemental fuel alcohol incentives in place would have the opportunity to reduce or eliminate them and the public in those states, who up to now have chosen not to encourage fuel alcohol market development, would be afforded the opportunity to utilize fuel alcohol.

It is also imperative that such tax incentives for fuel alcohol do not create substantial problems for highway revenue programs. Care must be taken in considering such legislation to provide for the continued support of our national and state highway systems and with creative tax legislation this issue should be satisfactorily accommodated.

Based upon the original 4 cent per gallon exemption from federal fuel excise tax, when concern over liquid fuel shortages was more prevalent and when wholesale gasoline prices were higher, an equivalent exemption at this time would be about 7 cents per gallon rather than 4 cents.

It is understood that the proposed tax changes for the 1984 tax law incorporates an increase of the present exemption from 5 cents per gallon to 6 cents per gallon for fuel alcohol. While this is welcomed by the ethanol industry it falls short of reaching the industry's needs based upon current economics. It is also understood that the Senate has proposd a bill to increase the ethanol fuel exemption to 6.75 cents per gallon and that this proposal will have to be negotiated in conference committee with the House Ways and Means Committee. The 6.75 cent incentive is most representative of the needs of the industry.

The other item that is particularly nettling about this "alcohol fuel" tax exemption legislation is the apparent failure in the past by both Federal and State Governments to adequately deal with the differentiation of "fuel alcohol". Alcohol is generic and should not, and cannot, be used without finite definition. The difference between methyl alcohol (menthanol) and ethyl alcohol (ethanol) is not fully understood by many.

It is Alco's understanding that these excise tax incentives should apply to alcohol produced from fermentation processes and not for alcohols produced from other hydrocarbon refining processes which include the fundamental processes used to produce methanol and "synthetic" ethanol. For example, why should the federal or state governments support with excise tax exemptions methanol-gasoline fuel mixtures which in some cases have been marketed against regulations when it is assumed that these incentives were put in place to develop an "ethanol-gasoline" based fuel resource for the nation? Nor should incentive support be extended to ethanol produced from petroleum or natural gas refining processes.

Recommendation: Alco recommends that the federal excise tax exemptions for ethanol-gasoline fuel mixtures be increased to 7 cents per gallon, or as proposed in a certain Senate Bill, to 6.75 cents per gallon. In addition, that the intent of the Congress be examined in relation to the extent of this incentive to those other alcohol-gasoline fuel mixtures which may not be derived from renewable resources. Consideration should also be given to increasing the excise tax exemptions further in an effort to create a "Federalized" incentive program which would allow the State Governments to reduce or eliminate their similar fuel tax incentive programs for fuel alcohol mixtures.

Alcohol Fuels Credit.—It would seem that such credits should follow the excise tax exemption in terms of amount. For example, if a 6, 6.75 or 7 cent per gallon excise tax exemption is passed into law such fuel credits should be increased to 60, 67.5 or 70 cents, respectively. This is simply a result of multiplying the excise tax exemption by a factor of 10 because only one part alcohol is used with gasoline to generate the tax exemption.

Recommendation: Alco recommends that the alcohol fuels credit be 10 times the federal excise tax credit for alcohol fuels and that the same criteria be established for defining alcohol fuels be applied in this legislation as in the above recommendation.

Duty on Imported Alcohol.—Importation of foreign alcohol (ethanol) has become a significant part of the alcohol fuel business. It does not provide domestic security in terms of liquid fuels nor does it provide jobs and business development for the rural areas where ethanol plants can economically produce such product. Ethanol imported from Spain or Brazil, for example, should have a significant duty imposed to protect the development of domestic ethanol refineries. If these nations choose to subsidize their ethanol industries they do so and have been doing so regularly. Even with the current 50 cent per gallon duty on anhydrous ethanol these nations continue to export millions of gallons of ethanol to the United States. These nations have the same needs to create jobs and to liquidate commodity inventories for U.S. dollars.

They are willing to export ethanol to the United States at net prices much less than $1 per gallon. This has had a significant dampening effect upon the development of the domestic ethanol business and some distributors have avoided domestic production facilities for ethanol since foreign imports have been readily available. It is understood that Brazil, for example, has an import duty of 160% on ethanol so it is evident that this country is not timid about protecting an industry it has created over the past 10 years.

It is understood that the proposed 1984 tax law addresses this issue, in part, by increasing the duty from 50 to 60 cents per gallon of anhydrous alcohol which is imported.

Recommendation: Alco recommends that such duty be increased to $1.00 per gallon as a part of the 1984 tax law. It is inconceivable why this country should continue exporting dollars for foreign ethanol while it supports the growth of a domestic industry at the same time.

Energy Tax Credits.—It is understood that the Senate tax bill would extend the 10% Biomass tax credit which ends December 31, 1985, through the year 1988. This would allow certain planned ethanol plants which may come on stream after December 31, 1985, to continue their development planning because such credits provide much of the financial incentive for many small and larger developers to arrange for capital to support such facilities.

Recommendation: Alco would support such an extension of the period in which energy tax credits could be taken on qualified ethanol production facilities.

Alco wishes to extend its thanks to the House Oversight Committee on Ways and Means for the invitation and opportunity to share these comments with the committee. Alco has been "doggedly" persistent in advancing its proposed ethanol plant project over the past four and one-half years with the encouragement and commitment of the Federal Government. It is vitally important that the Federal Government also persist in maintaining consistency in its commitments to the fuel alcohol industry in order that we mutually achieve the potential that the fuel alcohol industry provides for this country in the future. This will require a continued interlocking of private and public policy, consistent over time, to asssure that this occurs.

AMERICAN ENTERPRISE INSTITUTE FOR PUBLIC POLICY RESEARCH,
Washington, DC, June 26, 1984.

Hon. BYRON L. DORGAN,
Oversight Subcommittee, House Ways and Means Committee, Cannon House Office Building, Washington, DC.

DEAR CONGRESSMAN DORGAN: It is our understanding that the Oversight Subcommittee will hold a hearing on ethanol fuels on July 9.

I enclose the following AEI publications that may be of interest to you in conjunction with that hearing:

"The Gasohol Hangover," *Regulation Magazine,* Nov./Dec. 1981, p.12.

"Synthetic Fuels," *Regulation Magazine,* Sept./Oct. 1979, p. 18.

As you know, AEI makes no position. It does seek to provide research material that will shed light on public policy issues.

Sincerely,

RUSSELL CHAPIN,
Director, Legislative Analyses.

Enclosures.

The threat of either plan would impel the incumbents of both parties, and their allies throughout the state's political structure, to cut a deal acceptable to a majority of the legislature and the governor. The present system allows the contending forces to get close to a deal, leaving the courts to resolve only a few contested areas. Incumbents who are given safe districts under both parties' plans have no incentive to push for a full agreement. If they know that the court will throw out all plans and start from scratch, every politician will have the maximum incentive to see that the legislature carries out its constitutional responsibility to redistrict.

Such a revival of the political process would be to the benefit of both politicians and judges. Justice Frankfurter, in his dissent in *Baker v. Carr*, warned that judicial intervention in the political process would ultimately harm the courts more than the politicians:

> The Court's authority—possessed neither of the purse nor the sword—ultimately rests on sustained public confidence in its moral sanction. Such feeling must be nourished by the Court's complete detachment, in fact and appearance, from political entanglements and by abstention from injecting itself into the clash of political forces in political settlements.

That warning is more timely than ever in light of burgeoning proposals to redistrict the judiciary in various ways. Attorney General Smith recently remarked that courts "get into the political arena and [thereby] subject themselves to the same kind of to-do that the political branches are subjected to." The courts will help restore public confidence in their impartiality if they withdraw from the political arena of redistricting and force the political branches to fight it out.

The Gasohol Hangover

Alcohol seems to work its intoxicating effects on lawmakers in their public as well as private capacity. Last year Congress passed, as part of the Energy Security Act of 1980, an ambitious program of subsidies, preferences, and tax exemptions aimed at shifting, within ten years, 10 percent of the nation's gasoline use to alcohol distilled from crops and other organic sources. Since regular gasoline is blended with alcohol in a nine-to-one mix to make gasohol, virtually every motorist in the nation would have to shift to gasohol to meet that goal.

Now, on the sober morning after, two separate studies suggest that Congress overindulged. One, written by Fred Sanderson of the Brookings Institution for Resources for the Future, highlights the role of gasohol subsidies in driving up food prices. The other, written by Thomas Stauffer for Harvard's Energy and Environmental Policy Center, challenges gasohol's claimed potential to displace large amounts of imported oil.

Cost, not feasibility, is the problem, both authors agree. "The program is a notable rarity," Stauffer says, "in the sense that it is one of the very few energy programs where targets are likely to be met." The raw material is virtually limitless: it is possible to distill alcohol from all sorts of familiar crops, including potatoes (vodka) and sugar cane (rum), and even from unwanted matter like crop wastes, fallen leaves, and outright garbage. "Free" sources like the latter, however, are really quite expensive, since their transport and processing costs are high. For cost-effectiveness, it seems, there's just nothing like corn. While it is more expensive to grow than some alternatives, it yields the most promising type of alcohol, ethanol (the same sort that people drink), along with useful by-products like animal feed and cooking oil. According to estimates made before the Science Committee of the House of Representatives last year, these by-products were worth thirty-eight cents in 1979 for every gallon of corn ethanol. Corn prices would have to double in real terms, Sanderson says, before other sources of alcohol became competitive.

Ethanol is no ordinary corn likker. For one thing, the revenooers are not after it. Quite the contrary. They forgive it and the gasohol of which it is a part the four-cents-a-gallon federal gasoline tax—which is a much steeper tax abatement than it seems at first glance, since ethanol makes up only 10 percent of gasohol. About half the states provide for a similar exemption. Also, distillers of alcohol fuels get a special 10 percent federal investment tax credit.

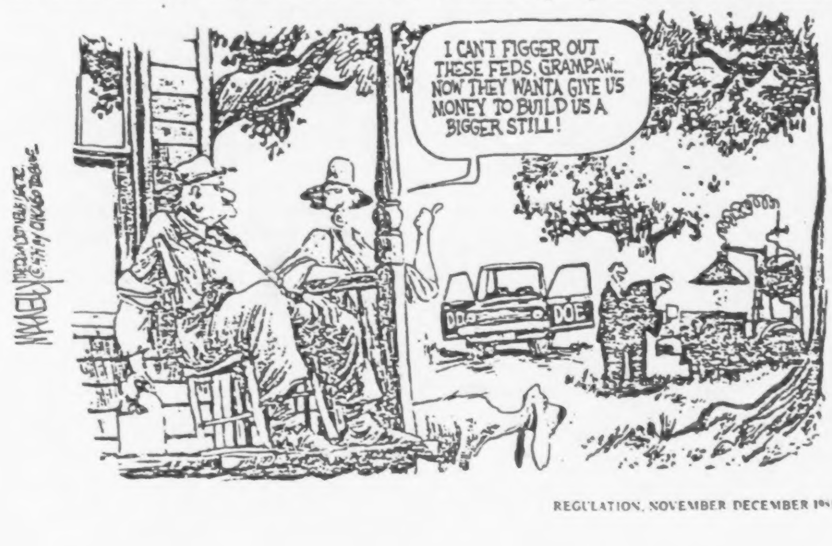
On the subsidy side, some of gasohol's advantages are evaporating. The Reagan administration has ended the crude oil entitlement program, which included a preference for gasohol, and has moved to curtail a $1.05 billion batch of grants, loans, and loan guarantees. But several other types of subsidy remain. Federal auto fleets, and perhaps those of federal contractors (depending on statutory interpretation), must use gasohol when it is available at "reasonable prices." Natural gas, with its low regulated prices, is important both in making fertilizer to grow the crop and in fueling distilleries, and both the farmers and the distillers of crop fuels have official priority in case of a natural gas shortage. The Agriculture Department is authorized to pay farmers to devote their set-aside acreage to fuel crops, and can also give alcohol producers preferred access to federal corn stockpiles at low prices.

The total value of the subsidies and tax preferences varies greatly from one distillery to another. The absolute minimum is forty-three cents per gallon of ethanol, counting forty cents' worth of federal gas tax exemption and three cents' worth of investment tax credit. It is much more difficult to fix a maximum. Gas tax exemptions offered in some states of up to ten cents a gallon for gasohol are worth up to a dollar a gallon of ethanol. Stauffer estimates that price controls on natural gas can represent as much as a seventy cents a gallon subsidy for ethanol and low-interest loans from the Small Business Administration another thirty cents. A distiller that managed to nab all of these preferences could obtain a cost advantage of close to $2.50 a gallon.

Even with advantages of this sort, gasohol has found it hard to compete with regular gasoline on the market. In Iowa it is a penny or two more expensive than regular unleaded gasoline, and in the Northeast the difference can be ten cents or more. Texaco, the leading gasohol marketer among oil companies, has just announced that it will end its two-year-old effort to sell gasohol in fifteen northeastern states; it blamed its decision on high transportation costs, "the lack of significant state tax incentives," and the current oil glut.

If the price differential for gasohol reflects a difference in production costs, it implies that ethanol is considerably more expensive to produce than regular gasoline—at least a dollar a gallon more. Stauffer estimates that ethanol's true current cost is at least $1.80 a gallon; but the Department of Energy, ever optimistic, has pegged it at $1.10 to $1.20 a gallon, a figure that would make gasohol cheaper than regular gasoline even if their tax treatment were alike.

New information on production costs, by itself, may not suffice to discourage gasohol advocates. During the "energy crisis" the federal government began to keep two sets of analytical books, an economic set and an energy set, for calculating a policy's costs and benefits. A policy that failed the economic test


I CAN'T FIGGER OUT THESE FEDS, GRAMPAW... NOW THEY WANTA GIVE US MONEY TO BUILD US A BIGGER STILL!
DOE
DOE
MACNELLY

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might still be embraced if it saved more energy than it cost. How much oil, then, does gasohol save?

Despite years of experience, these is still no consensus on even the basic question of whether cars get better mileage from gasohol or regular gasoline. Stauffer argues that a gallon of ethanol contributes no more than its energy equivalent in gasoline, or about 63 percent of a gallon, resulting in a "mileage penalty" of 37 percent for pure ethanol (or 3.7 percent for gasohol in the usual nine-to-one blend); Sanderson assumes that the mileage penalty for ethanol is 20 percent. On the other hand, ethanol enhances the octane content of fuel, enabling refineries to save crude oil. In Sanderson's estimate there is a 20 percent fuel saving, just enough to balance the mileage penalty; Stauffer believes the saving is somewhat lower.

The major energy costs of gasohol are indirect. If oil, alcohol, and natural gas are grouped under a common heading of easily substituted "premium fuels," it may not even be true that gasohol always increases the nation's net fuel supply. It takes on average at least 25 percent of the energy content of ethanol just to grow the corn. If marginal land is brought into production to meet a surge in demand for corn, energy use may be much higher still, since such land requires extra doses of energy-laden fertilizer and energy-transported irrigation water. For example, Stauffer says, it takes nearly twice as much energy to grow a bushel of corn in Nebraska as in Iowa, primarily because of irrigation power. In addition, most ethanol distilleries burn large quantities of scarce oil or natural gas (although there are two that burn only coal). If a typical gas-burning distillery uses corn grown on marginal land, Stauffer says, it runs at a net premium-fuel loss, and oil imports increase. A new, more efficient generation of gas-burning distilleries will improve matters somewhat, Stauffer says, but even they will still consume from 59 percent to 85 percent of a barrel of oil for each barrel of ethanol they produce, depending on whether average or marginal energy input went into growing the corn. If ethanol costs remain at Stauffer's estimated level of $1.80 a gallon, the cost of replacing imported oil will run from $127 a barrel (for average corn) to $287 a barrel (for marginal corn). Those costs are over and above the current cost of the imported oil, which is around $35 a barrel. Even a newly designed coal-burning distillery, in Stauffer's view, would cost at least $70 to $80 for each barrel of imported oil it displaced.

The assumption that ethanol costs will remain stable, however, may be pure moonshine. Gasohol production is still in its infancy, and federal plans call for it to rise more than twentyfold by 1990. Without gasohol, total domestic and foreign demand for U.S. grain in that year is expected to reach 330 million tons. That is about 20 percent above current levels, an increase that could be met by improved productivity without a significant rise in real food prices. Federal gasohol targets, however, call for an added 100 million tons of grain by 1990. Even allowing due credit for the by-products of distilling, Sanderson says, it is "all but certain" that a gasohol program of this size "will push real prices of corn and other feed grains to twice their 1979–80 levels."

Such a doubling of feed prices, which several earlier studies have also predicted, would have dramatic implications for food prices in general. Feed grains make up two-thirds of the production cost of chicken and eggs, one-half of the cost of pork, close to half of the cost of milk, and one-quarter of the price of beef. In all, according to Sanderson, food prices as a whole would rise by about 12 percent.

The most ironic cost of the gasohol program may show up in the nation's balance of payments. Not all the demand for grain for distilling will be met by increased production; some will be taken out of exports and domestic consumption. While the U.S. can probably raise prices to monopoly levels on some crops, making exports more lucrative, it will surely lose sales of crops for which it does not have a large competitive advantage. Since a drop in domestic food consumption will be extremely unpopular, the government will also be under pressure from consumers (as well as distillers) to curb exports in order to supply domestic wants. Finally, foreign countries will seek ways to cut their newly expensive food imports from the United States, just as we are trying to avoid buying oil from OPEC. If they succeed, and U.S. food exports decline dramatically, gasohol will lose even its most modest claim, that of improving the nation's balance of payments.

SYNTHETIC FUELS

Should the government subsidize nonconventional energy supplies?

Paul L. Joskow and Robert S. Pindyck

THE CENTERPIECE of President Carter's energy policy is a program of massive subsidies to hasten the commercial development of synthetic fuels and other "nonconventional" energy supplies. While the ultimate size of the effort will be determined by the Congress, the administration has proposed spending over $100 billion in the next decade, and views this program as its major instrument for bridging the growing gap between our consumption and production of energy.

The particular sources of energy likely to be most heavily subsidized by this program include oil from shale rock and gas and liquid fuel from coal, but subsidies will also be allocated to solar energy, biomass, wind power, and other technologies. Producing energy from these sources does not require fundamental new scientific or technological advances. Shale oil was first produced in Britain in the 1850s, and gaseous and liquid hydrocarbons were produced from coal in Germany during World War II and are being produced today in South Africa. But energy from these sources is often called nonconventional because it is not at present being produced or consumed in significant quantities in the United States or, for that matter, almost anywhere else. The reason is quite simple—these sources of energy are extremely expensive. It is difficult to say just how much more expensive they are than conventional energy supplies, but estimates we have examined put them at twice the cost, on a thermal-equivalent basis.

Of course, as conventional energy supplies become increasingly scarce and their prices rise, shale oil, gasified coal, solar energy, and a variety of other nonconventional sources may become commercially viable, and in fact may eventually displace conventional oil and natural gas as major fuels. When that day will dawn is difficult to predict. But if, as the Carter administration argues, it will be in the next decade, why is it that we do not already observe the private sector gearing up to produce these sources of energy in the absence of federal subsidies? More important, is it desirable to spend billions of tax dollars to subsidize these sources of energy sufficiently to make them economically attractive to producers and consumers? At a time when there is growing pressure to limit government spending in areas like health, education, and the environment, are these subsidies to specific energy supply technologies really in the public interest?

The Plan for Government Involvement

In the President's proposal for an Energy Security Corporation to support the commercial development of nonconventional energy, as in alternative plans, government subsidies take a variety of forms. First among these are direct subsidies to reduce the cost and increase the profitability of new energy technologies. The most common form of direct subsidy is the use of government revenues to finance part or even all of the construction of "demonstration plants" for nonconventional energy—a demonstration plant being a production facility at (or close to) commercial scale whose construc-

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tion provides a way of finding out the actual cost and operating characteristics of each technology. This information is useful more for evaluating the "commercial" possibilities of a specific technology than for obtaining basic or applied scientific knowledge.

Outside of the military and space programs (where commercial viability is not an issue), the government has traditionally focused its R&D expenditures on financing basic and applied scientific research, leaving industrial development and commercialization to the private sector where both the benefits and costs of expenditures can be most effectively balanced. But it is now argued that, without direct government subsidies to finance the construction of demonstration plants, private firms will face too much uncertainty to allow them to make the "correct" investments.

Of course any new technology involves uncertainty and requires an investment in learning—problems long recognized in our patent system. Private investors are normally willing to undertake such projects when the expected rewards from success are greater than the expected losses from failure. Yet we are now being told that, for nonconventional energy, the government should bear much of the cost and the risk because the private sector is unwilling to do so. We have not, however, been told why it should be necessary for the taxpayer to bear these costs if these technologies are in fact "good bets."

Tax credits are another form of proposed subsidy, though one that is somewhat less direct. If the production of a particular form of energy is at all profitable in the long run, tax credits will obviously increase the aftertax profitability. And even if a particular project is *never* profitable, tax credits may have the effect of reducing the overall tax burden to the companies, and thus making the new technology more attractive. The energy tax credits specified in the President's plan are substantially those contained in last year's unsuccessful energy tax bill. They include a $3 per barrel credit for oil from shale and tar sands, a 50¢ per mcf credit for geopressurized methane and for any gas from a nonconventional source, and residential credits for home insulation and expenditures on solar and wind energy.

Loan guarantees, likewise an indirect form of subsidy, are also part of the President's plan. Because shale oil and coal gasification and liquefaction projects have large capital requirements, debt-financing costs are a major component of total cost. By reducing the riskiness of loans, loan guarantees reduce financing costs. What this form of subsidy costs the public is difficult to measure, since that depends on the number and sizes of loans that default. An extensive program combined with a high default rate could be very costly.

We have gathered and evaluated cost data for several nonconventional energy sources and have found only limited prospects for profitability. To put it simply, at least for the next several years, conventional sources are likely to be cheaper than nonconventional sources (for specific data, see Saman Majd, "Financial Analysis of Non-Conventional Energy Technologies," MIT Energy Laboratory). It is therefore not surprising that the private sector has not been particularly interested in developing these sources without the government subsidies; indeed their development is probably not an efficient use of society's scarce resources. It does not make sense to invest large sums of money in projects that do not appear to be economical, unless it can be shown that there are good reasons why the decisions made by the private sector are inconsistent with the public interest.

> **[If those] who are in the best position to assess the commercial value of alternative energy supplies . . . are not interested in attempting commercial development, why should the taxpayer overrule their decisions. . . .**

We must always remember to ask the question: if energy producers and consumers, who are in the best position to assess the commercial value of alternative energy supplies, are not interested in attempting commercial development, why should the taxpayer overrule their decisions and—what is worse—pay for doing so?

The Rationale for Subsidies

Two basic arguments are made in favor of government participation in the development of nonconventional energy supplies. The first says that the United States is becoming more and more dependent on imported energy from sources that are increasingly insecure and that we can reduce this dependence by accelerating the production of new domestic energy supplies. There is no question that U.S. dependence on imported energy is increasing as the gap between our energy consumption and our domestic energy production continues to grow. The issue, however, is whether there are more efficient means of bridging the consumption-production gap that would end up costing the American public less.

The second argument says that projects to produce these energy sources are of a special nature that makes it difficult or impossible for them to be undertaken by the private sector without government assistance. Moreover, the administration claims that the special nature of these technologies is such that government participation in their commercialization will be needed even when energy prices are higher. Proponents of this view usually point to the fact that commercialization of these technologies typically involves large capital expenditures and, in some cases, considerable risk, so that private firms would be unwilling or unable to raise the necessary capital and make the necessary investments. In effect, it is argued that there are significant market imperfections which make nonconventional technology *look* unprofitable to private firms, even though its social value is considerable, and that it is these imperfections which justify intervention.

Here we examine these two arguments in some detail to determine whether they do indeed justify the kinds of programs the Carter administration is now proposing. We also present what we think is the proper role of the government in the commercialization of nonconventional energy supplies—first in the context of an ideal, or "first-best," energy policy, and then in the context of a "second-best" energy policy operating under the kinds of political constraints that are likely to exist in the near future.

New Energy Technologies as a Substitute for Imports

Before we consider whether the subsidization of nonconventional energy supplies is a desirable way of reducing the gap between domestic energy consumption and production, we should be clear on just why that gap exists. For the last several years, U.S. energy policy has kept the domestic price of energy well below the world level. Maintaining an artificially low price for consumers—and domestic producers—has stimulated energy demand and, at the same time, reduced domestic production. Some 4 to 6 million barrels per day of our current 8 or 9 million barrels per day of oil imports can be traced directly to recent policies that have kept domestic energy prices far below world market levels. (See article by R. Hall and R. Pindyck in *The Public Interest*, Spring 1977.)

Two principal policies have been used to maintain a low domestic price of energy. One is the crude oil price controls entitlement program, which taxes the domestic production of oil (by holding its price below the refiner's price) and uses the proceeds of the tax to subsidize imports (thereby reducing the cost of high-priced imported oil to the refiner). This has had the effect of keeping the average price of crude oil to U.S. producers about 50 percent below the world price—and has had the interesting side effect of putting the U.S. government in the business of subsidizing oil imports from OPEC.

The second policy is the regulation of the wellhead price of natural gas, which has held natural gas prices far below the world market level for many years, producing domestic shortages even before the 1973 oil embargo. The Natural Gas Act of 1978 represents a major step in correcting this policy, although gas prices will not reach free market levels for several years.

Now the administration, in its synfuel proposals, is asking taxpayers to finance the difference between the high cost of producing nonconventional energy in the United States and the low price consumers will be asked to pay. But Americans will be much worse off with higher taxes than with higher energy prices. Individuals can choose to avoid paying higher energy prices by limiting their consumption, but they have no choice about the taxes they must pay. The proposed "commercialization" program will force consumers to pay a good portion of the high cost of energy indirectly, through their taxes. As a result, there will be little incentive to conserve, so consumption will rise while production falls. A growing tax burden will then be required to finance a growing amount of subsidized production.

Rather than subsidize nonconventional energy, it would be better to purchase oil and natural gas at home and from abroad at world market prices. Offering government subsidies of one kind or another to developers of new energy forms means requiring the nation to pay much more for energy than is necessary—which is exactly what government policy should avoid.

Offering government subsidies . . . to developers of new energy forms means requiring the nation to pay much more for energy than is necessary. . . .

A counter argument sometimes raised is that the development of more expensive nonconventional energy should be accelerated today so that lower-cost conventional energy can be saved for future generations. But this argument ignores the time value of money—which makes it cheaper for us to consume low-cost supplies now, in 1979/80, and higher-cost supplies then, in the future. As conventional oil and natural gas reserves are gradually depleted, the market prices of these resources will rise, so that eventually we will shift to higher-cost resources such as shale oil, gasified coal, and solar energy. To reverse this order of use by accelerating the commercialization of nonconventional supplies would only impose an unnecessary cost on the American public.

New Energy Sources and Market Imperfections

We have argued that if a new energy technology does not appear profitable to the private sector, its development may well not be an efficient use of society's scarce resources. But in some cases there may be significant market imperfections that make the technology *appear* unprofitable to private firms, even though its true social value is quite high. It is only in such a case that some type of government intervention might be desirable.

Those who advocate government intervention often point directly or indirectly to one or more alleged failures of the market. Here we examine those alleged failures that have attracted the most attention.

Energy Price Imperfections. As we have pointed out, government regulation has kept most energy prices below their true marginal social cost. But it is prevailing or expected market prices on which private firms base their decisions about the profitability of new energy technologies.

Government price regulation has therefore created an important disincentive to investments in new energy technologies. It may be that such investments are "justified" by a complete analysis of the costs and benefits to the U.S. economy, even though private firms do not find them attractive in the face of regulated energy prices that do not reflect the true social costs of additional consumption to the U.S. economy. Since energy prices are "too low," we cannot expect the private market to provide the proper signals on new sources of supply.

While price regulation clearly leads to an important market imperfection, it is an artificial one created by the government's own actions. To set things right the government can either eliminate the source of the problem by allowing energy prices to rise to replacement cost, or it can try to "balance" the disincentives created by regulation with additional incentives in the form of subsidies to new technologies. We will explore this matter later on.

Discount Rates. It is sometimes contended that private firms, when making investment and planning decisions, use discount rates that are "too high" and that therefore bias their decisions away from capital-intensive projects like the commercialization of nonconventional energy supplies. There are essentially four reasons cited to explain why private discount rates tend to be higher than the "social" discount rates that should be used to properly evaluate the benefit of a project to society.

First, it is argued that social discount rates are lower than private discount rates because private agents do not value the well-being of future generations sufficiently. Using a lower social discount rate would lead us to shift expenditures towards more investment (and less consumption) today and more consumption tomorrow. (Alternatively, some have argued that we should impute a lower social discount rate in cost-benefit calculations so as to account for external economies or public goods characteristics that are not properly accounted for by private decision-makers.*

Second, it is argued that market interest rates ordinarily include some premium for the risk (or uncertainty) associated with the investment. This risk is reflected in (real and nominal) differences in the interest rates of risky and safe assets. Proponents of subsidies argue that such risk premiums would be unnecessary with government investment projects, since the government is so large and has so many projects over which it can diversify risk that its investments could be treated as being riskless. Government investments would therefore be evaluated at lower interest rates than those private firms use, reducing their apparent costs and making the investments more profitable from a "social" point of view.

Third, it is argued that corporate taxes distort discount rates, since the rate of return on private projects must include a provision for the payment of income and other taxes. According to this argument, because the government does not have to pay taxes to itself, the social rate of discount would be lower than the private discount rate, making projects "socially profitable" even though they are unprofitable in the private market.

Finally, it is argued that the *social* returns from domestic energy projection are higher than the private returns. A reason given for this is that an increase in domestic production will lead to a reduction in imports, which in turn will lead to a reduction in the OPEC price.

For alternative energy sources, all four arguments are largely specious. Most of the historical discussion of social discounting has been conducted in the context of very large capital-intensive projects (such as dams), which have very long lifetimes as well as public goods characteristics and external economies, and which will be owned and operated by the government. But new energy technologies do not fit this bill.

There is also little evidence that private firms "overdiscount" the future, though this is a question not really subject to objective analysis. In any case, there is no reason to believe that such an effect would appear only in energy supply and demand decisions.

While it is true that government bonds will carry a lower interest rate than other bonds because bondholders always expect the government to pay up, this is risk reduction from the viewpoint of investors rather than from the viewpoint of society. If new energy technologies are inherently risky, there is little reason to believe that the government can make them any less so. Government only shifts risk from investors to taxpayers: it does not eliminate it.

It is true that the government might be in a better position to diversify risks than the private capital market when such extremely large amounts of capital are involved that the risks of default cannot be adequately absorbed by a single firm or a consortium of firms. But such situations are rare. The investments contemplated for most new energy technologies are not significantly larger than the amounts the energy industry has been able to raise in the past. Private firms have had little or no trouble in raising capital for projects like the Alaskan pipeline, liquefied-natural-gas tankers, oil refineries, and large chemical plants—projects whose capital requirements were of roughly the same magnitude as a shale-oil or coal-gasification plant. If there is a problem here it is not in the size of plant investments required.

The argument that taxes distort discount rates is likewise specious. The capital that might be used by the government to finance a project has an opportunity cost—that is, it is withdrawn from the private sector, thereby losing returns from private investments that would otherwise have been made and losing tax revenues that such investments might have generated. In short, the cost of obtaining funds for public investment projects is equal to the gross rate of return, including taxes, forgone by diverting this capital from the private sector to the public sector.

Finally, it is unlikely that a reduction of 2 or 3 million barrels per day of imports (in 1990) will significantly affect the OPEC price, since the United States simply does not have enough effective monopsony power as a buyer of OPEC oil. But even if it did, subsidizing particular synthetic fuels is surely not the most cost-effective way of reducing imports.

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*By "public goods characteristics" we refer in particular to the fact that once a "public good" exists (a highway, a dam, or a navy), it costs little or nothing for each additional user to gain its benefits—which, of course, makes cost allocation difficult.

It is thus hard to be impressed by arguments that private decision-makers use a discount rate that is "too high." Let us therefore turn to the other arguments about market imperfections.

Capturing the Benefits of Technological Information. Considerable technological information might of course be forthcoming from greater R&D efforts. But—it is argued—because this information is difficult to keep private, the benefits will not all accrue to private investors, and thus private firms will tend to underinvest in R&D. Alternatively, greater patent protection might solve this problem but would be undesirable because of the distortion caused by the resulting monopoly power.

While this argument is generally true for R&D activities that produce basic scientific and technical knowledge, it is not applicable to the commercialization of new energy technologies. Commercialization is not basic research. Most new energy technologies that are candidates for huge subsidies are well understood. While there may be some uncertainty about their ultimate cost, the uncertainty is no greater than what is involved in many other ventures commonly undertaken by private firms. Thus, while a good case can be made for government funding of basic energy research activities, the argument does not apply to government funding for the industrial development and commercialization of alternative energy technologies.

Regulatory Uncertainty. The technological and economic risks of new energy technologies are likely to be overshadowed by uncertainties about environmental regulations. Environmental (and other public policy) controversies surrounding the Clinch River Breeder Reactor and the Barnwell Reprocessing Plant are examples of the kinds of problems potential investors fear.

Uncertainties over the ability to meet current and future environmental standards are present in many industrial investments, but are probably greater for such energy technologies as shale oil and coal gasification. These technologies raise new and different environmental questions, and to the extent that environmental standards may not be promulgated until the plants are operational, there may indeed be significantly greater regulatory uncertainty.

The environmental problems fall into three main areas: air quality, land, and water. Plant emissions and fugitive dust can cause air quality problems. Second, both the plants and mines needed for these coal technologies and the disposal of the spent shale may seriously scar the landscape. Indeed the use of the land for these plants may permanently destroy vegetation and wildlife and, as with Appalachian coal-based synfuels, render agricultural and forest lands unsuitable for their original use, even with reclamation. Reclamation and revegetation would be even more difficult in areas of low precipitation. Finally, the development of these technologies raises concern over the adequacy of water supplies and the pollution of existing sources, since synthetic fuels production requires large quantities of water. In some regions this would mean a shortage of water for other uses (for example, agriculture). Discharge of pollutants into surface streams and leaching into underground sources are dealt with at the planning stage by designing the plants for "zero-discharge," involving recycling of spent water for use at the plant site. But whether the discharge will be quite "zero" at full-scale operation remains to be seen.

It has been argued that understanding and solving the environmental problems presented by new energy technologies may require the technology to operate for some period of time. While this would provide the information needed to draw up regulations, the technology may not be developed without clearly defined regulations because of the associated uncertainties. To the extent that this dilemma exists, the construction and operation, of first-of-a-kind facilities may have "public goods" characteristics that would justify some form of government intervention. On the other hand, regulatory reform, leading to the removal of unnecessary, even counterproductive, regulations and to a clarification of the kinds of environmental standards likely to be enforced in the future, seems a better way of dealing with this kind of market imperfection.

The Proper Role for Government

If the President's proposals are adopted, subsidized nonconventional energy supplies will soon be relied upon to help close the growing gap between the consumption and production of energy in the United States. This would indeed be unfortunate. Most of the gap comes from price controls on crude oil, natural gas, and electricity, and it would be much more effective and much less costly to eliminate the regulation that produces the gap than to subsidize expensive energy substitutes for low-priced but nonavailable energy. Eliminating price controls would enable us to begin using nonconventional energy supplies as they become economically viable.

> **Of the various forms of market imperfections . . . put forth as reasons for government intervention, the . . . most serious is uncertainty over future regulation.**

Of the various forms of market imperfections that are put forth as reasons for government intervention, the most real and most serious is uncertainty over future regulation. We have noted the existing uncertainty about future environmental constraints and regulations, but of even greater concern to the potential producer of new energy technology is uncertainty over future government *price* regulation.

The commercialization of shale oil, for example, is a risky venture. Indeed, if private firms do undertake it, they will do so only because they see a profit potential large enough to warrant the considerable risk. The fear of private firms, however, is that while they will be permitted to lose almost any amount of money, they will not be permitted to make almost any amount of money. Firms considering shale oil projects rightly worry that, if the world price of conventional oil rises considerably over the next decade so that a shale oil facility turns out to be an economic success, the government will then regulate the price of the shale oil, thereby reducing the profits that can be earned.

Private firms usually have no problem with downside risk as long as there is a commensurate potential for profit on the upside. The problem with nonconventional energy supplies is that firms are unwilling to take downside risk when they perceive a probable government ceiling on upside potential. It is therefore not surprising that these firms are asking for various forms of government subsidies to limit their downside risk. Once again, government subsidies are a costly and unnecessary alternative to dealing with the problem directly. The removal of price controls—and the guarantee that controls will not be imposed on the prices of nonconventional energy supplies produced by the private sector in the future—would eliminate the one form of market imperfection that is indeed significant and serious.

Decontrol of the current and future prices of energy supplies is the most important part of a "first-best" energy policy. This, together with a revision of those environmental regulations that are unnecessary and unreasonable and a clarification of environmental standards and regulations that would apply in the future, would permit private firms to develop new energy technologies at a socially optimal rate. There would then be little or no need for the government to subsidize the commercialization of these technologies. While we would hope to see continued government support for basic energy research, subsidies for the production of nonconventional energy supplies are no more warranted than subsidies for the production of sugar, tobacco, or peanuts.

> **. . . subsidies for the production of nonconventional energy supplies are no more warranted than subsidies for . . . peanuts.**

It has been argued that the deregulation of domestic energy prices is politically impossible, at least over the next several years. Would this make government subsidies for new energy technologies desirable? That is, if we cannot have the "first-best," what role should the government play in the commercialization of these technologies as part of a "second-best" policy?

In this case, the government should use its limited resources to reduce the cost (or the risk) of producing nonconventional energy supplies, but should avoid determining the specific technologies to be developed. An especially attractive way to do this would be for the government to provide price guarantees or purchase agreements for broad categories of nonconventional energy supplies, rather than subsidizing specific demonstration plants or tech-

(Continues on page 43)

STATEMENT OF HON. BERKLEY BEDELL, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF IOWA

Mr. Chairman, I appreciate this opportunity to offer my comments on the state of our young alcohol fuels industry, and I want to commend you for bringing the Committee to the Midwest for a first-hand assessment of the progress we have made.

Indeed, the modern alcohol fuels industry has made substantial progress since its rather recent emergence. The industry's new era began in the fall of 1978 when a handful of service stations in Iowa started to market the first few gallons of a gasoline-ethanol blend then known as "Gasohol." By May of this year, service stations in 33 states around the country were selling the gasoline-ethanol blend, at a rate approaching 5 billion gallons annually—that's nearly 500 million gallons of anhydrous ethanol per year.

In those early days of the late 1970's, ethanol from corn was looked upon simply as a means of stretching our limited gasoline supplies, while utilizing surplus corn stocks. The oil shortages and sharp oil price increases brought about by events in the Middle East in 1979, accompanied by a slump in grain prices, greatly boosted demand for this "new" product.

The renewed interest in alcohol fuels brought increased public attention and government support to the industry. Congress in 1978 exempted alcohol-blend fuels from the former $.04 federal gasoline excise tax, a National Alcohol Fuels Commission was created, and the House Agriculture Committee approved the first major bill to clear a congressional committee that would provide direct government financing for commercial alcohol production. That legislation, "The National Alcohol Fuels and Farm Commodity Production Act of 1979", which I authored, was later made a part of the Energy Security Act that was signed into law in 1980. That same year I also joined with my colleague, Congressman Tom Daschle—one of the first and strongest supporters of alcohol fuels—in founding the Congressional Alcohol Fuels Caucus, a bi-partisan coalition of House and Senate proponents of alcohol fuels, which is still active today.

Mr. Chairman, there is a widely-held public perception, I think, that progress in expanding the alcohol fuels industry ground to a halt in 1981 as a growing world oil glut led to falling oil prices. Nothing could be further from the truth. In fact, in the face of a decline in oil exploration and drilling activity, the shelving of one synthetic fuels project after another, and the dramatic decline of the nuclear energy industry, the alcohol fuels industry has compiled a record of steady growth.

The reasons for that persistent, if unheralded, growth are many. First, to combat largely unfounded concerns about ethanol's harmful effects on automobile engines and the conversion of "food to fuel," the "Gasohol" label was dropped in the early 1980's in favor of more generic and less controversial names such as "super unleaded with ethanol", and so on. The name change not only helped to spur consumption, it also, conversely, led many to think that the alcohol-blend fuel was no longer being marketed.

Second, ethanol's demand, based initially on the need to stretch fuel supplies and work off farm surpluses, took on a wider and more sophisticated appeal. Although ethanol was still viewed as a significant alternative energy source and an important outlet for our chronic farm surplus, it was also recognized for its valuable octane enhancing properties, its benign environmental effects, and—because of the renewable and decentralized nature of ethanol production—its potential contribution to our national security.

Perhaps the principal reason for ethanol's quiet growth in recent years is its attractiveness as an octane booster. The ethanol in a 90% gasoline-10% ethanol blend generally increases the octane rating of a gallon of the fuel by 3 points, and thus allows the fuel, aided by the current federal gasoline excise tax exemption, to compete very favorably with the several chemicals used to increase octane in unleaded gasoline. Moreover, ethanol, unlike lead or the additives used to boost octane in unleaded gasoline, does not pose significant environmental hazards.

Mr. Chairman, recently the Committee on Ways and Means, during conference deliberations on H.R. 4170, the Deficit Reduction Act, wisely agreed to increase the federal excise tax exemption for ethanol from $.05 to $.06, and maintain the exemption through its scheduled 1992 expiration date. The committee is to be commended for its continued endorsement of this fuel. Please let me explain why I believe that the exemption makes so much sense from both a fiscal and farm policy standpoint.

Clearly, alcohol production is a major boon for our agricultural economy. Today, more corn goes into alcohol production than we export to the EEC and Eastern Europe combined, and with farm export markets stagnant, this new outlet for corn is increasingly important. As I mentioned at the outset, today we are selling nearly

5 billion gallons of ethanol-blend fuels annually—almost 500 million gallons of pure ethanol. If you accept the U.S. Department of Agriculture's rule of thumb that for each 100 million bushels of corn that we use annually corn prices are increased about $.05 per bushel, then the 200 million bushels of corn currently consumed by our domestic ethanol industry (500 million gallons/2.5 gallons of ethanol produced from each bushel=200 million bushels) has strengthened corn prices by $.10—that's an additional $800 million ($.10/bushel × typical 8 billion bushel corn crop=$800 million) in taxable income to U.S. corn farmers.

To encourage the production of those 500 million gallons of alcohol—and the resulting $800 million in taxable income to farmers—the federal government provided excise tax exemptions totaling $250 million [500 million gallons of ethanol × ($.05 × 10)=$250 million].

In addition, it is conceivable that, in a year when about one-half of our total corn production is eligible for a guaranteed "target" price, the higher corn prices generated by corn-to-alcohol production may save almost $400 million [200 million bushels × $.10 × (.5 × typical 8 billion bushel corn crop)=$400 million] in direct cash outlays to farmers by the federal government.

These benefits and savings are in addition to the income, employment, and balance-of-payment benefits which result from the construction and operation of the alcohol production facilities, the displacement of foreign crude, the "ripple effect" of higher corn prices through our farm economy, the reduction in health-related costs due to the elimination of lead and other harmful octane boosting additives, and so on.

I am confident that the increased exemption recently provided by the tax bill conferees will be met by increased investment and job creating activity on the part of the ethanol industry, a further reduction in federal farm program costs, a cleaner environment, and enhanced energy security for the U.S.

Again, Mr. Chairman, I want to commend the committee's far-sighted support of the alcohol fuels industry, and I appreciate your taking the time to learn of the progress the industry is making.

[News release: A Nation at Risk, July 9, 1984]

STATEMENT OF TERRY BJERKE, DIRECTOR, FARMERS POLITICAL WATCHDOG COMMITTEE

The Farmers Political Watchdog Committee this day declares: "A state of National Emergency regarding American Agriculture and the future Economic Security of our Nation."

As our entire agricultural community faces an unprecedented financial dilemma equaled only by the Great Depression of the thirties and our country's balance of trade deficit is predicted to be as much as $120 billion this year, our present Secretary of Agriculture only states that "Things are OK on the farm." He states that the United States must drop domestic prices for commodities even further in order to increase exports as he himself only continues to borrow millions of dollars in unsecured debt.

There are also others involved in agriculture who believe or are motivated by their own greed that this nonsense of lowering our domestic agriculture prices further below production costs to try to export more is the answer. How many pairs of shoes can a business afford to sell at $10 a pair under production cost? The truth is that even though agriculture prices have declined the last few years our agriculture exports have also declined. From statistics offered by the Nebraska Wheat Counsel the prices received for United States agriculture products fell (5.5 percent) from the 1981–82 years to the years of 1983–84 and contrary to the philosophy of our much indebted Secretary of Agriculture and others including the grain trade, our agriculture exports fell (26.4 percent). The United States suppliers also continue to have the lowest foreign destination price quotations. Thusly the United States is leading the world price to the gutter.

With the agriculture situation as it is and the trade deficit approaching $120 billion per year the President and Congress should immediately take drastic steps to eliminate the need for imported oil, which imports are expected to be $60 billion in 1984. These huge imports of oil can only be negated by the immediate use of already existing programs and laws to implement facilities nationwide to produce large amounts of ethanol from our agriculture products from both grain alcohol and bio mass conversions. The United States must become self sufficient regarding energy as other countries are becoming self sufficient in the production of food stuffs. How can our leadership continue to allow oil rich countries to extract our financial wealth by infinitely raising their oil prices and then using that wealth to become self sufficient in producing their own food stuffs and also using it to purchase large sectors of our financial institutions.

The Farmers Political Watchdog Committee now calls on the President and Secretary of Agriculture Block to immediately implement all aspects of Public Law 96-294—June 30, 1980 "Energy Security Act."

This would include:

1. The immediate release by the Secretary of Agriculture of $600,000,000 under Title II for Biomass energy and alcohol fuel projects.
2. The immediate release by Secretary of Energy of $850,000,000 for Biomass energy and alcohol fuel projects.
3. The Secretary of Agriculture should immediately implement Title XX which would allow for the production of commodities for the conversion into alcohol to be raised on all set-a-side acres. This is only common sense that we should use these acres for the production of renewable fuel sources instead of paying farmers not to produce.

The Farmers Political Watchdog Committee demands the President immediately take a position to transfer the $14.1 billion in unobligated funds of the Synthetic Fuels Corporation to the Secretary of Agriculture and Secretary of Energy for the immediate use in implementing Biomass energy and alcohol fuel projects to become self sufficient in energy fuels.

As the war continues in the middle east and our agriculture community at home topples because of failed policies the Farmers Political Watchdog Committee calls also on the President to declare "A State of National Emergency regarding American Agriculture and the Future Economic Security of our Nation."

STATEMENT OF EUGENE T. ROSSIDES, COUNSEL, ON BEHALF OF INTERNOOR TRADE, INC.

On behalf of our client, Internoor Trade, Inc. ("Internoor"), an importer of alcholo fuel from Brazil, we submit this statement to express their extreme concern with the series of increases of the import duty on ethyl alcohol that have occurred over the past four years. Internoor, a domestic corporation, is the United States subsidiary of Petrobras, a company owned by the Brazilian government which produces and exports ethyl alcohol. Internoor markets fuel-grade ethyl alcohol to gasohol producers in the United States.

SERIES OF PROTECTIONIST TARIFF INCREASES

Until recently, imported alcohol fuel was subjected only to a three percent ad valorem duty. In 1981, an additional duty of 10 cents per gallon was imposed under temporary legislation, which amount was increased to 20 cents in 1982. Last year this additional duty was first increased to 40 cents and later to 50 cents per gallon. This year the additional duty was increased even further to 60 cents per gallon, a 2100% increase in four years.

These increases in duty have been linked to increases in the exemption from Federal gasoline excise taxes given to gasohol, i.e., a mixture of gasoline and alcohol fuels. Apparently, it has been determined that this exemption is necessary to enable gasohol products to compete with regular gasoline products. Whether or not this is the case, by again increasing the tariff on foreign alcohol fuels on a tandem basis with the increase in the gasoline excise tax exemption, the United States is imposing a virtually insurmountable tariff barrier to imports of this product. We urge the rollback and elimination of this series of import duties.

VIOLATION OF U.S. TRADE OBLIGATION TO BRAZIL

The target of this tariff action is primarily Brazil, the only substantial exporter of alcohol fuel to the United States. Continuing increases in the tariff on ethyl alcohol is in direct violation of the United States obligation to Brazil under applicable trade agreements. Indeed, the United States has already agreed to compensate Brazil for imposition of the additional 1982 and 1983 tariff levels. With the increase this year, the United States continues to violate even further its obligations under these trade agreements. The U.S. will either have to provide further compensation or be subject to retaliation by Brazil.

Moreover, this series of increases of duty builds a protectionist wall against this product at the very time that the United States is encouraging legitimate Brazilian exports as a means of easing that country's current financial crisis. Imports from Brazil of alcohol fuel into the U.S. comprise only about one-seventh of the total market for such product in this country. Yet, the economic advantages given to domestic producers have grown so extreme, they no longer provide merely a reasonable incentive to stimulate a domestic industry but rather are clearly calculated to prohibit *any* importation of the product, even from a long time friend such as Brazil.

This series of clearly protectionist-oriented additional tariff increases is not only unfair to a friendly ally in need of U.S. dollars but is also unnecessary in light of other benefits provided to domestic alcohol fuel producers and is contrary to the long term interests of the United States.

ECONOMIC ADVANTAGES ALREADY PROVIDED TO DOMESTIC PRODUCERS OF ETHYL ALCOHOL ARE MORE THAN SUFFICIENT

In the interest of reducing the dependence of the United States on foreign oil imports, Congress has established a package of tax incentives to encourage the production of ethyl alcohol. These tax incentives include an exemption of 6 cents per gallon from the 9 cents per gallon Federal gasoline excise tax, if at least 10% of the mixture is alcohol. This amounts to an exemption of 60 cents per gallon of ethyl alcohol (approximately one-third the gallon price) since it is combined with gasoline at a ratio of 1:10 to form gasohol. While this exemption is available to gasohol made from both domestic and imported alcohol fuel, the latter has already been subjected to an offsetting import duty of 60 cents per gallon. Therefore, domestic producers have a 60 cents per gallon advantage over Brazilian imports.

In addition, domestic producers receive a 10% investment tax credit on equipment purchased in connection with the initiation of their operations and an additional 10% tax credit on investments in equipment used to produce ethyl alcohol. Moreover, many domestic producers have benefitted from multimillion dollar loan guarantees, feasibility grants and research and development grants from the Department of Energy and the U.S. Department of Agriculture. It is clear that domestic producers of ethyl alcohol are the beneficiaries of substantial subsidies and have enormous economic advantage over importers.

INCREASED IMPORT DUTIES ON ETHYL ALCOHOL FAIL TO SERVE U.S. TRADE INTERESTS

The United States Trade Representative, William E. Brock, in a letter to Congress dated June 6, 1984, opposed this year's increase because of its protectionist nature and its improper violation of applicable trade agreements. (A copy of that letter is attached to this statement as Exhibit 1.) Not only is it improper for the United States to violate a trade agreement through increased economic protection for domestic ethyl alcohol producers, it is also imprudent. When the United States violates the trade agreement in question, it must compensate Brazil by reducing or eliminating the tariff on some other imported product. Indeed, Ambassador Brock stated in his letter that the proposed increase in import duty threatens the negotiated compensation package worked out with Brazil over prior increases in the duty. Therefore, the additional increased duty on ethyl alcohol, a product for which domestic producers already enjoy a tremendous economic advantage, serves only to reduce or eliminate any advantage enjoyed regarding some other product produced by the American farmer or other producer. In the long run, the Amercian farmer loses.

In addition to the direct negative impact on other American products through compensation under applicable trade agreements, the increased import duty may well cause Brazil to take a similar protectionist attitude toward U.S. imports into that country. Protectionist legislation is simply not the way to alleviate the U.S. trade deficit or protect the long term interests of American farmers and producers who so ardently support free trade as essential for the portion of their own production which is exported. The door to free trade with an ally like Brazil must be kept open for both sides.

U.S. CONSUMERS' INTERESTS ARE DAMAGED

The series of increases of the import duty on ethyl alcohol has ignored the interests of United States consumers in regard to the availability of less expensive imports and the impact on the environment. The limitation of ethyl alcohol availability to less than one percent of gasoline demand, through the discouragement of imports, may well serve to injure both the economic and physical health of the American consumer. The import duty serves to keep the price of ethyl alcohol artificially high to the American consumer. In addition, the import duty prevents the greater use of ethyl alcohol and its clean burning properties by the American consumer. In other words, the import duty operates to pollute the air more than necessary by preventing the greater use of clean-burning ethyl alcohol in lieu of lead burning gasoline.

Ethyl alcohol works not only as a relatively clean-burning substitute for leaded gasoline when included in a gasohol mixture, it is also used as an octane booster in no-lead or low-lead gasoline. In light of the recent action of the Environmental Protection Agency in proposing the almost total elimination of leaded gasoline by 1986, the demand for clean-burning octane boosters such as ethyl alcohol is likely to increase considerably in the near future. With the extraordinary series of additional duty increases on ethyl alcohol and the relatively low output of domestic producers, it is questionable whether there will be an adequate supply to meet such a demand.

U.S. NATIONAL SECURITY INTERESTS HARMED

The series of tariff increases on ethyl alcohol conflicts with U.S. long-term national interests. While the United States needs an alcohol fuel industry of its own, it is also important to the U.S. for national security reasons to have as an alternative source a healthy alcohol fuel industry in a Western Hemisphere nation, particularly one with the type of open political system that exists in Brazil.

One purpose of the tax incentives for domestic ethyl alcohol is to promote an industry which will help the United States become less dependent on oil imports from the Persian Gulf and other unstable areas. According to a General Accounting Office report commissioned by Senators Percy, Durenberger and Exon, domestic ethyl alcohol production equaled only about one-fifth of one percent of gasoline demand in 1982 and will meet only about one percent of gasoline demand by 1990. Obviously, then, the use of ethyl alcohol as a meaningful alternative to Persian Gulf oil necessitates imports from friendly nations such as Brazil. U.S. production of ethyl alcohol alone will simply not at this time provide the national security benefits which the tax incentives are designed to produce.

In sum, given the economic, environmental and national security demand for ethyl alcohol, discouraging imports from Brazil through increased import duties is not in the best interests of the United States. We submit that these tariff increases are unnecessary from the point of view of protecting the American industry involved and should be eliminated or drastically reduced. They are contrary to the best interests of U.S. consumers. They harm U.S. national security interests. They are in clear violation of trade commitments, and are the very sort of protectionist overkill that is deplored when it occurs overseas.

EXHIBIT 1

THE UNITED STATES TRADE REPRESENTATIVE,
Washington, DC, June 7, 1984.

Hon. ROBERT J. DOLE,
United States Senate, Washington, DC.

DEAR BOB: There is a provision with serious implications for our bilateral trading relationship with Brazil that will be considered in the Conference on the deficit reduction package.

Title VI, Section 614, Subsection (e) of the Senate bill increases the duty on imported ethyl alcohol from 50¢ to 67.5¢ per gallon. I urge you to reject this provision because its adoption will jeopardize an agreement with Brazil to resolve a compensation claim arising from previous tariff increases on ethyl alcohol. The Brazilians agreed to suspend their claim in return for the reduction of the U.S. tariff on canned corn beef as provided for in Section 122 of H.R. 3398. Enactment of an additional tariff on ethyl alcohol now would undermine this agreement and force us to reopen the compensation discussions.

Increasing the duty will also adversely affect over $52 million in 1983 imports from Brazil at a time when that country is experiencing very serious economic and social problems due to its external debt crisis. The Brazilian Government desperately needs exports to earn foreign exchange necessary to meet its financial obligations. This year, partly as a result of the Brazilian threat of a further duty increase, imports of ethyl alcohol have already dropped from $31 million in the first quarter of 1983 to $5.9 million during the comparable period in 1984.

I hope the Conference Committee can take into consideration the trade implications of its action on this issue. Thank you for the opportunity to comment on this provision.

Very truly yours,

WILLIAM E. BROCK.

STATEMENT OF JACK WADE, PRESIDENT, KENTUCKY POWER ALCOHOL ASSOCIATION, INC

The Kentucky Power Alcohol Association (KPAA) is grateful for this opportunity to submit written testimony for the printed record of the hearing held on July 9th by the Subcommittee on Oversight of the Committee on Ways and Means, U.S. House of Representatives regarding tax incentives for the production and use of ethanol fuels. Kentucky is an important market for ethanol fuel. Since 1981, ethanol-gasoline blends have grown from a miniscule quantity to representing almost 20 percent of the motor fuel market in Kentucky. Kentucky now ranks fifth among the states in total market penetration.

As a trade association dedicated to the development of the ethanol fuel industry in Kentucky and the nation, the KPAA is particularly concerned with the policies of the federal government and the states with regard to ethanol taxation. To date, the federal government and many states have recognized, via their taxation policies and other instruments, the broad-based benefits attributable to the production and use of ethanol derived from domestic biomass resources. These benefits, which accrue to the agricultural community, the energy sector, the environment and the economy have been well documented and expounded upon in other testimony to this subcommittee, particularly that of the Renewable Fuels Association. The intent of this testimony is to offer the perspective of a regional organization, representing most of the major ethanol fuel producers in the Ohio Valley region, the farm community, gasoline distributors, engineering firms and equipment suppliers, on the trends prevalent with regard to ethanol taxation and the direction which should be taken in future national policy with regard to ethanol fuels.

The Energy Tax Act of 1978 contained the cornerstone for the development of a domestic resource based ethanol fuel industry with it's $.04/gallon exemption from the federal motor fuels excise tax until December 31st, 1992. However, the financial incentives which have provided the margin necessary to induce most of the current ethanol fuel producers to enter the market and have enabled them to survive the twin effects of drought and the oil market glut have come from the states. It is these state incentives which currently shape the markets for the vast majority of ethanol fuel.

As the attached map prepared by Information Resources Inc. indicates, state tax incentives for ethanol fuel create a patchwork of market opportunities. These state incentives vary widely in the amount offered and their accompanying time frames and restrictions. In addition to the complex marketing arrangements required by this structure, the states are continually reevaluating their policies with regard to ethanol fuel incentives. At least twelve states have passed or are considering passage of new or revised legislation concerning ethanol fuel in 1984. With each change in the existing pattern of state legislation, the marketers of ethanol must reevaluate their market opportunities and profit potential, introducing great inefficiency into the operations of these producers. This inefficiency exists in both the administrative costs necessary to maximize revenues and in transportation costs due to the inability of the producers to rely on the entire national transportation network for more efficient product delivery.

Despite these inefficiencies, the state incentives have at least enabled the ethanol fuels industry to survive the last couple of years. The states have largely been able to provide this support through the widespread sharing of the cost of the incentives. However, recent developments with the state tax incentives threaten to undermine the fragile and uncoordinated state support efforts. Two of the top six states for ethanol fuel marketing have reduced their tax incentive for ethanol effective July 1st. In Indiana, the second largest ethanol market, the exemption dropped from 3 percent of the wholesale price to 2.5 percent, while in Iowa, the sixth largest market, the exemption declined from $.03/gallon to $.02/gallon. In addition, Michigan, the third largest market, will reduce it's exemption from $.04/gallon to $.01/gallon on January 1st, 1985 ($.01 of which is due to the provisions of the Tax Reform Act of 1984) and Illinois, the fifth largest market, is expected to reduce it's exemption from 4 percent to 3 percent of the wholesale price in the Spring of 1985. Together, these states represent over 45 percent of the market for ethanol fuels. These developments will potentially require some substantial redefinition of ethanol markets and increase the burden of support on neighboring states, including Kentucky. The consequences of such concentration of markets on fewer states could be quite severe for the industry.

It is with this background, in addition to the previously established arguements for federal support of ethanol fuels, that future federal policy towards ethanol fuel should be evaluated. As has been noted, many benefits relative to the production and use of ethanol fuels have been identified. Yet federal policy towards the development of the industry, although strengthened by the upcoming $.01/gallon increase in the federal motor fuel tax exemption, remains dependent upon the states for any real measure of success. As such, it may be argued that the federal government has yet to fully accept the benefits offered by ethanol production and use as national benefits.

The time appears to be rapidly approaching when the federal government should clearly define where it sees ethanol as offering the greatest public benefit and accept it's responsibility to bring the industry past it's financial point-of-no-return. In the near term, this area of greatest benefit may be in it's contribution to farm income and crop production stability. The recently released study by the General Accounting Office of the Federal alcohol fuel tax incentives analyzed the ways in which ethanol production contributed to the 1982 federal revenue balance through it's impact on agricultural commodity prices, which held down government agricultural price support program outlays, and through the dairy price support system. A draft of this study indicated that federal revenue savings of $129 million were attributable to these two program savings alone. The same study estimated that by 1990, the ethanol fuel industry would increase net farm income by $3.597 billion over a base case with no ethanol industry.

Given the substantial benefits attributable to the ethanol fuel industry in the agricultural sector, it appears logical that agricultural policy should serve as the foundation for federal support of ethanol fuels. Consequently, the KPAA recommends that the federal government utilize the upcoming 1985 Farm Bill as a vehicle for clearly establishing federal policy in support of ethanol production as one approach towards a market-oriented agricultural policy, rather than paying farmers to be non-productive. This approach could take the form of a "federalization" of the nation's support for ethanol fuels at a $.08/gallon exemption level from the federal motor fuels excise tax through 1992, or could be in the form of an incentive on the input side, reducing feedstock costs to ethanol producers. If the incentive were to retain the current fuel tax exemption format, the Highway Trust Fund should be reimbursed if a true federalizing of the support for ethanol is to occur.

The KPAA believes that such action, combined with appropriate federal recognition of ethanol's benefits to the environment, energy supplies and the economy, will pay significant dividends to the country. In addition, by having a consistant and singularly adequate incentive structure for ethanol fuel production and use, the industry will be able to develop it's most efficient markets and methods of transportation in a manner conducive with conventional governmental support of emerging industries.

Statement of the Massachusetts Technology Park Corp.

The Massachusetts Technology Park Corporation respectfully presents a written statement in support of an amendment to the Internal Revenue Code calculated to ensure that our Nation's colleges and universities have the opportunity to benefit from comprehensive, negotiated partnerships between State government and business and industry in complex and emerging areas of science and technology education.

The importance of technology based higher education to the economic development of the United States is not subject to question. It is a matter of historical record that the growth and development of some of our most important industries, including textiles, agriculture, aerospace, medical science and electronics, but to name a few, have depended upon the capabilities and resources of our institutions of higher education. And it is reasonable to propose, without concern for overstatement, that the futures of our Nation's mature industries and high technology service section alike are inextricably related to the ability of our colleges and universities to offer sophisticated academic and research opportunities in areas such as microelectronics, advanced materials sciences, robotics and automated devices.

Yet, notwithstanding the importance of technology based higher education to this Nation's economic future, our institutions of higher education are increasingly frustrated in their attempts to engage in basic research and research training activities in critical, emerging areas of science and technology education. Although the reasons for such frustration are many and include a shortage of qualified faculty and an inability to arrange for effective technology transfers from the business to the academic spheres, the most egregious obstacle to full university participation in the advance of technology is the lack of access to the sophisticated scientific equipment and machinery required therefor. The capital costs associated with such scientific equipment are substantial and the capital costs required to maintain educational facilities at a level consistent with development technology have become prohibitive.

It was in due recognition of the foregoing that the Congress enacted Internal Revenue Code Section 170(e)(4) in the Economic Recovery Tax Act of 1981 creating a substantial tax incentive for "qualified research contributions" to colleges and universities. A manufacturer of scientific equipment is entitled to donate state-of-the-art inventory property to an institution of higher education if such equipment is subsequently employed by the donee in basic research or research training activities in the physical or biological sciences. This farsighted provision of the tax code has enabled many universities to secure scientific equipment which would have been otherwise beyond their means, to the immediate benefit of the students and faculty and to the ultimate benefit of our economic future.

The Senate version of the Deficit Reduction Tax Bill of 1984 contained an explicit acknowledgement of the importance of this tax incentive for contributions of scientific equipment: Section 883 thereof would have continued the curent law and expanded the types of property for which such an incentive is available to include computer software and used equipment. The Corporation wholeheartedly supported the efforts of the United States Congress in this regard. Unfortunately, Section 883 failed to survive the review of the House-Senate Conference Committee earlier this summer.

The amendment which the Corporation is today proposing was a relatively minor portion of said Section 883 of the Deficit Reduction Tax Bill. It would have expanded the class of donees eligible to receive "qualified research contibutions" to include a wholly owned instrumentality of a State which creates and operates sophisticated educational facilities which are accessed on a shared-use basis by a number of colleges and universities simultaneously.

It has become apparent that in certain emerging areas of science and technology education it is beyond the capacity of a single institution of higher education, even with an eligibility to receive "qualified research contributions" to support the creation and operation of the expensive facilities required for sophisticated academic and research opportunities. Indeed, it is the reasoned determination of many concerned with the development of technology based higher education that, just as the required scientific facilities are often beyond the capacity of a single college or university, so too are such facilities beyond even the collective capacity of a consortium of institutions of higher education. What is required, in certain cases, is a new and innovative administrative vehicle: a public instrumentality which creates comprehensive, negotiated partnerships between State government and business and industry for the benefit of a number of institutions of higher education.

In Massachusetts, the Legislature has created just such an innovative administrative vehicle. The Massachusetts Technology Park Corporation is a public instrumentality established to further economic development by developing negotiated partnership agreements between the State and business and industry which serve to increase the capacities of Massachusetts colleges and universities to offer academic programs and research opportunities in certain emerging areas of science and technology. As provided by the Massachusetts Technology Park Corporation's Enabling Act, a negotiated partnership is to take the form of a State owned physical facility known as an "educational center". Each educational center shall be created and operated jointly with State provided support and contributions of scientific equipment and machinery from business and industry and is to be accessed on a shared-use basis by the public and private colleges and universities of Massachusetts.

Universities currently participating in the Massachusetts Technology Park Corporation and represented on its Board of Directors include: Boston University, Massachusetts Institute of Technology, Merrimack College, Northeastern University, Southeastern Massachusetts University, Tufts University, the University of Lowell, the University of Massachusetts and Worcester Polytechnic Institute. Businesses which are similarly participating and represented are: Alpha Industries, Analog Devices, Data General Corporation, Digital Equipment Corporation, GCA Corporation, Polaroid Corporation, Prime Computer, Inc., Raytheon Corporation, Unitrode Corporation and Wang Laboratories.

The first educational center of the Massachusetts Technology Park Corporation shall be a facility concerned with semiconductor and microelectronic technologies, to be known as the Massachusetts Microelectronics Center. The Commonwealth of Massachusetts has appropriated the sum of twenty million dollars ($20,000,000) as its share of the cost of creating this Center. Certainly, this exciting and attractive approach to a collective effort in support of technology based higher education stands deserving of the amendment proposed here today.

Absent the enactment of the proposed amendment to the donee provisions of Section 170(e)(4)(B)(i) of the Internal Revenue Code, there is a substantial question as to whether the Corporation would qualify as a proper donee. Such an adverse result would frustrate the interests of the colleges and universities of the Commonwealth and, ultimately, threaten the entire Massachusetts economy.

Accordingly, the Corporation respectfully requests adoption of an amendment to Internal Revenue Code Section 170(e)(4)(B)(i) which expands the class of eligible donees for qualified research contributions to include public instrumentalities which create comprehensive negotiated partnerships among State government, business and industry and institutions of higher education.

STATEMENT OF DAIN FRIEND, VICE PRESIDENT, LEGISLATIVE AFFAIRS, NATIONAL CORN GROWERS ASSOCIATION

Mr. Chairman, my name is Dain Friend and I am vice president, legislative affairs of the National Corn Growers Association representing corn growers in the 16 principal producing states.

Corn growers have long supported the concept of a renewable fuel industry using corn as a raw material. From the early days of the fuel crunch and long gas lines of 1974 when corn growers were promoting the use of "gasohol" with bumper and pump stickers to the present moment when blended fuels account for more than 4% of the U.S. motor fuel market, corn growers have been leading advocates of ethanol blended fuels. We have encouraged the federal government to provide a temporary economic incentive by means of the federal motor fuel tax exemption for ethanol blended fuels and have been active at the state level in some 34 different states to originate and maintain a state exemption to help get the industry off the ground.

As growers, our interest is twofold: the assurance of a domestic fuel supply that is not dependent on foreign imports and the improved utilization of the U.S. corn crop.

When consumers were experiencing long gas lines and the attendant inconvenience, farmers in the United States were concerned about a fuel supply for their tractors and harvesting equipment. An assured domestic fuel source could play an important role in assuring food and fiber supplies. Use of ethanol as an octane enhancer provides such an efficient octane boost that for each barrel of ethanol used up to two additional barrels of high octane gasoline can be produced. In 1983 fuel ethanol blends reduced the U.S. imports of crude oil by roughly 10 million barrels. In 1983 180 million bushels of corn were utilized for ethanol fuels. Utilization in the current year is expected to increase by more than 20%. As we face a world market where foreign government subsidies and restrictions, dollar valuation, high interest cost and foreign production increases restrict our overseas trade opportunities, it is vital to us that the domesitc corn market for fuel ethanol be maintained and improved.

Our desire and our need is to produce maximum corn volume at lowest possible cost for greatest efficiency. Fuel ethanol utilization of corn is estimated to increase the average price per bushel of corn by 25¢. Therefore the National Corn Growers Association is committed to efforts which will encourage maximum utilization of the corn crop.

We strongly feel that the federal and state system of incentives for ethanol fuel is a much better expenditure of public funds than the corn production curtailment alternatives. Existing incentives designed to serve as a catalyst for market expansion with the state incentive expected to result in construction of indigenous production facilities to service the market previously created. Once the creation of a sufficient market and acceptance of the product is demonstrated, new production is being built. Fuel ethanol production capacity increased 100 million gallons in 1983 to 575 million gallons. New production presently under construction totals 84 million gallons.

A domestic fuel alcohol industry is a perfect example of an industry that applies value added processing to abundant domestic resources in the way that increases economic activity, creates jobs, and increases federal, state and local tax bases.

Corn growers presently have projects under consideration that will investigate the utilization of an important feed byproduct of the ethanol industry in the more economical wet form. Such investigation as well as promotion of the effectiveness of ethanol as an octane enhancer over against other enhancers will very likely expand the ethanol market. As a corn grower, I can assure you that we are doing everything possible to produce corn as efficiently as modern technology and good management will permit simply because the present lack of profit in corn production offers us no other choice.

If all existing fuel ethanol capacity and capacity under construction were operated at full production, corn utilization for ethanol would total 260 million bushels, an amount equal to ⅐ of 1983/84 corn exports. Growers are urgently seeking to capitalize on this and all other demand enhancement opportunities. Such usage expansion is desperately needed to return profitability to corn production.

Corn growers strongly support H.R. 5727 as a sensible way of encouraging the ethanol industry and corn utilization while discouraging the continued use of a known deadly substance which is extacting a heavy penalty in human suffering in this country.

National Grange
Washington, DC, April 27, 1984.

Hon. Dan Rostenkowski,
Chairman, Committee on Ways and Means, U.S. House of Representatives, Washington, DC.

Dear Mr. Chairman: The National Grange has been concerned about the motor fuel tax exemption granted gasohol since its inception in the Energy Tax Act of 1978. In 1980 the Delegate Body of the National Grange recommended phasing out the motor fuel tax exemption for gasohol over the next two years. That policy was modified in 1982 by recommending that the gasohol tax exemption be phased out by 1985.

We feel that if the highway and bridge needs of this country are to be met, the Highway Trust Fund needs the funds being drained away by the motor fuel tax exemption granted gasohol. The U.S. Treasury has estimated that the increase in the gasohol exemption from 5¢ per gallon to 6.75¢ will cost the Highway Trust Fund $680 million through fiscal year 1988.

BACKGROUND

To help reduce dependence upon imported energy and to stimulate alternative domestic resources, the Energy Tax Act of 1978 exempted gasohol from the 4¢ per gallon federal motor fuel tax. The exemption was extended until 1992 by the Crude Oil Windfall Profits Tax of 1980. The Surface Transportation Act of 1982, which raised the motor fuel tax to 9¢ per gallon, increased the gasohol exemption to 5¢.

During consideration of the Energy Tax Act, the Senate promised to deal with reimbursing the Federal Highway Trust Fund for gasohol revenue losses. This promise was never kept. The current 5¢ per gallon exemption is projected to cost highway users $200 million this year and increase annually to $260 million in 1988.

POSITION

The gasohol exemption is a diversion of revenues from highway users to alcohol producers. The exemption allows some highway users to avoid paying their fair share of highway costs and increases the burden borne by others. The current loss is a reduction in sorely needed funds for highway and bridge preservation and improvement.

The exemption is now five years old, and the production of gasohol is well established. The initial purpose of the exemption to stimulate a young industry has been fulfilled. The tax exemption should now be phased out.

The Senate tax package would increse the present 5¢ per gallon federal motor fuel tax exemption for gasohol to 6.75¢. We therefore urge the House Conferees to reject the Senate proposal on gasohol.

Thank you.

Sincerely,

Edward Andersen,
Master, The National Grange.

Statement of C. William Swank, Executive Vice President, Ohio Farm Bureau Federation, Inc.

Mr. Chairman and members of the Subcommittee on Oversight, Committee on Ways and Means, my name is C. William Swank of the Ohio Farm Bureau Federation, Inc., 35 E. Chestnut Street, Columbus, Ohio 43216. My telephone number is (614) 225-8911.

As executive vice president of Ohio's largest farm organization, this year with a record total of 94,634 members, we point out that Ohio farmers hold an extraordinary interest in tax incentives for the production and use of ethanol fuels.

With the committee's permission, Mr. Chairman, I speak on behalf of the Farm Bureau and its thousands of farmer-members who supply corn for ethanol. I also speak on behalf of the Ohio Farm Bureau as a 20 percent owner of South Point Ethanol. This 60-million-gallon/year plant is located on the Ohio River, 32 miles east of Portsmouth on St. Rt. 52. A major co-product of this large dry milling ethanol plant is distillers dried grains with solubles (DDGS), an important livestock high protein ration supplement. In this plant we produce 220,000 tons of DDGS per year from 24 million bushels of number two field corn. Another by-product, soon to be captured in the plant is carbon dioxide (CO_2).

As you can see Mr. Chairman and members of the committee, our basic interests in your subject today are quite clear. We appreciate the opportunity to express our views to you on this topic which is vital to agriculture and an integral part of our nation's farm program.

We believe:

1. One may not stay in business long if he can't control the source and price of his product. As helpful as ethanol tax incentives are, from a practical point of view, the manufacturer still is at the mercy of his market. It's the blender who receives the incentive, prices his gasoline using his best competitive judgment, and the ethanol plant gets only the income that fits under the umbrella of the gasoline price.

So, on a theoretical basis, the tax incentive does get applied at the pump where Congress intended. However, petroleum pricing is a moving target from refiner to blenders in the wholesale and retail levels. Pump prices may vary from station to station while the 5-cent federal incentive gets applied on a standard basis as only a part of the pricing mechanism.

A serious problem exists in that the ethanol product is based upon a feedstock cost totally unrelated to prices in the petroleum market. When poor weather, for example, drives corn prices up, unrelated conditions may drive the gasoline prices down. Ethanol marketing always must deliver its product at a price less than the lowest price of gasoline (generally 10 cents lower) as an incentive to cover handling costs. This hard economic reality must be overcome, in the short-term at least, if the ethanol industry is to continue as Congress intends.

2. The ethanol industry is even more vital to our national security than Congress determined it to be when this alternative fuel was launched about five years ago. In 1983 the U.S. imported one-third of its liquid petroleum requirements, which could be disrupted at any time. Events in the Persian Gulf proved the wisdom of Congressional assistance in getting the ethanol industry going.

3. To make this industry successful, farmers must be a vital part of this patriotic program. Both the Carter and Reagan Administrations' leadership have said this on many occasions. Ethanol is made from both surplus and new corn each year, so it is, indeed, a renewable fuel, environmentally safe, and acceptable as a octane booster by blenders, refiners, consumers, and auto manufacturers.

4. Accepting the challenge and assistance of Congress in the public interest, American farmers, the financial community, and industry have teamed together with the auto manufacturers and petroleum people to bring this fuel to successful reality. Funding for significant ethanol production is a bright chapter in American history demonstrating the partnership between government and the ethanol industry proves our country's good faith, spirit and ingenuity still exist. Congress, on one hand, has asked that this new fuel be developed and then offered financial aid. Farmers and industry, on the other hand, generated risk capital and operating funds, often with great economic plan, but always with good faith in helping to achieve our country's objective and hoping to see some profit reward in the end. All partners are people of their word in providing funds for these projects.

5. Throughout the entire progress of our nation's ethanol development, it has been known in the law that lead as an octane enhancer eventually would be eliminated or its use sharply curtailed. Now, due to medical studies and other published data relating to lead as a poisonous substance, the U.S. EPA is quoted as seeking to accelerate the removal of lead from auto fuels by 1988, instead of 1992. One of the few, if perhaps the only fuel additive that has had a successful consumer quality acceptance history, is environmentally safe and made from a renewable source as Congress intended, is ethanol; and it could quickly replace lead.

6. In order to sustain this new and increasingly vital ethanol industry, tax incentives must be maintained. The issue is a much larger one on the longer term with the national security involved than a relative rapid yearly tax debate in a myopic method. These tax incentives by law are to run to 1992. This decision by Congress to

implement these tax incentives caused huge American investments in good faith, with Congress so far has kept and improved in it wisdom. To jeopardize these courageous financial acts at this time would be tragic, and certainly not in keeping with the integrity Congress exemplifies on behalf of our nation. These new industries, their investors, employees and consumers must be protected as planned by people who relied on the law.

7. Since the ethanol industry has gotten underway commercially in only the last two or three years, a series of events has threatened the supply of ethanol making the various tax incentives even more vital.

A. Weather over this period running the extremes of drought, flooding, too heavy spring rains delaying corn planting, and other events affecting farmers, have caused corn prices to rise abnormally.

B. Gasoline prices have fallen to precarious levels for ethanol marketing which must meet wholesale rack prices at their lowest levels.

C. High fructose production flooding the protein market for livestock has depressed DDGS prices. This new DDGS product is still being developed in world market and yet is unknown in some places.

D. Some states which wisely have implemented their own incentives similar to Congress, now tinker with them. This weakens confidence by investors, tends to cause chaos in market shifting, and disappoints citizens in believing in the good faith of government.

E. Some non-renewable fuel boosters made with high percentages of methanol that damage auto engines and often are not environmentally safe sometimes flood safe ethanol markets. These non-renewable additives are made mostly from natural gas that probably should be heating our homes.

F. A few petroleum companies appear to deliberately confuse consumers by advertising that "alcohol" is damaging to automobiles. These petroleum companies do not help the public interest in confusing consumers between successful ethanol and the injurous methanol blends.

G. And finally, a few of these petroleum companies are main opponents to ethanol by attacking ethanol tax incentives while they themselves, thrive on billions of government dollars of their own—giant subsidies which dwarf the little bit of necessary help ethanol needs.

All of these reasons, and many more Mr. Chairman, mean that it is imperative Congress continue the necessary tax incentives it has granted, or improve them, to keep this industry solvent as requested by Congress.

Now, Mr. Chairman, your committee has requested recommendations for the future. We believe:

1. Some standardization of incentives is needed and the Congress has made progress in raising the federal level twice to six cents per blended gallon in two steps from the original four cents. This proof of good faith is commendable. However in some states there has been some tinkering of their own incentives, usually brought on by a few large petroleum companies. Congressional level statesmen are used to dealing with these giant petroleum companies, while state legislators sometimes are overly impressed with such lobbying. As a result, changes of local incentives, or the threat of change, causes chaos in ethanol marketing from state to state.

It would be very helpful if Congress could establish an adequate incentive (perhaps nine cents) to permit the states to eliminate their incentives and thereby return reason to ethanol marketing.

2. As national policy was adopted to create the ethanol industry, now national policy should declare the proper existence of this industry. Such a guarantee could be an insurance program for those ethanol plants now operating or under construction. Most plants have government aid now, and heavy private investment. Laws which threaten the solvency of such plants or frighten investors should carry some insurance that these plants will be protected, of course within reason. Such protection would be granted only in overwhelming events which an ethanol plant itself cannot control—a reduction in OPEC prices levels, drought which raises corn prices beyond economic limits, depression of distillers dried grain prices due to U.S. dollar re-evaluation, watershed changes in national policy or law, and other serious types of occurances.

3. As Payment-In-Kind (PIK) caused, in part, a rise in corn prices, Congress may want to establish a special incentive price for farmers growing corn for ethanol. In this manner the feedstock price at the ethanol plant may not exceed, for example, three dollars per bushel. The incentive could flow from the plant to the farmers—this only in the overwhelming event of bad weather or new law. It has been noted that 100 ethanol plants could have been built with the amount of money that went into the PIK program.

4. With the apparent advent of lead in gasoline needing to be replaced, perhaps by 1988, ethanol production will need to be increased in rapid order. Looking at ethanol plant lead times, Congress should consider encouraging planning, if not actual construction, by calling the auto, petroleum and ethanol people together soon to prepare for this octane replacement in a positive and firm manner. Otherwise upon the relatively sudden need for the product, the petroleum industry may face a shortage of an environmentally safe enhancer which is acceptable in the market now. And, Mr. Chairman, some petroleum companies indicate they would utilize ethanol now if they were assured of a dependable supply. We in Ohio are launching off to explore rapid construction of larger plants in case they are needed, which might be the situation if the lead phase-down does become reality soon. The ethanol industry, working together with the energy producers of our nation promise we will help keep our nation strong in this basic foundation of our America's defense, good health, and prosperous economy.

Briefly, Mr. Chairman, these are our positions in agriculture as we see them in Ohio. We urge your continued support. We pledge our efforts to assist you and your colleagues. And finally, Mr. Chairman, we believe we need each other as continuing, successful and firm partners to keep our energy base solid in the public interest.

Thank you, Mr. Chairman, and members of the Subcommittee. If there are questions, we will respond.

STATEMENT OF HARRY SCOTT, WILMOT, SD

As Chairman of the Roberts County Board of Commissioners and an active farmer, I am concerned with what is happening to our most precious resource, our soil.

Anyone who has seen what has happened to our soil in high rainfall areas this year, should know that we must use our fragile land in better ways.

One way in by taking away all crop loans, FHA loans and federal enticement to use row crops on fragile land. This land or much of it could exist if row crops were put on class 1 or 2 land.

Then other more fragile land could be used for bio-mass production of alcohol with closely seeded and no till programs. Some crops such as sugar cane forage, sugar beet tops and most necessary of all funds to encourage experimental crops developed for use on fragile lands also tax credits and low interest experimental farms for this purpose.

Our county tax base is being eroded also by farm bankruptcies, low farm income and value of rapidly erodable lands under fence to fence farming encouraged by our current farm programs.

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